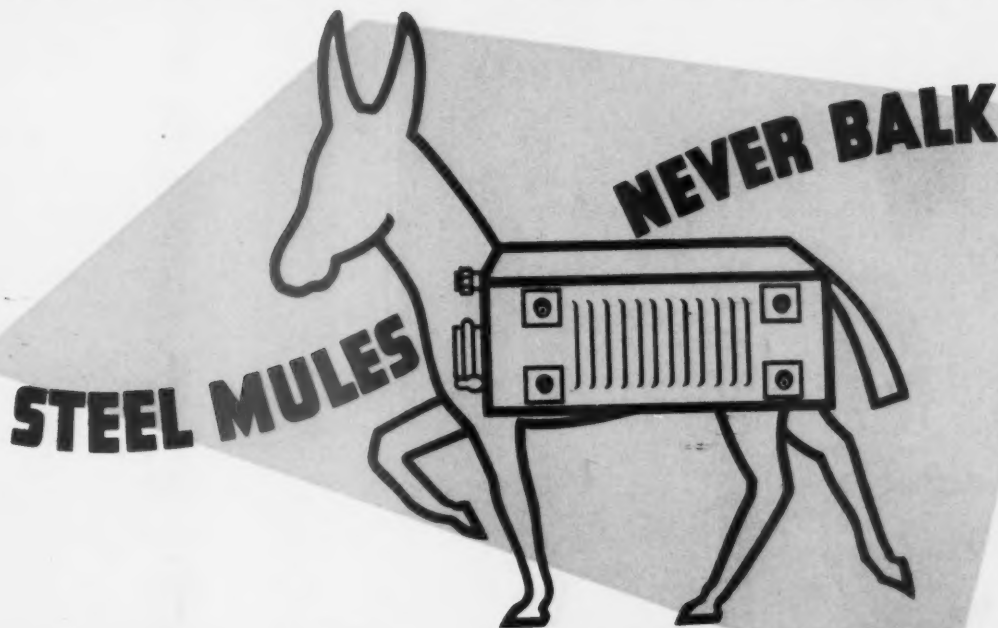


MINING CONGRESS JOURNAL

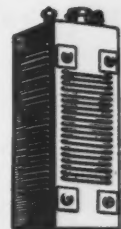
APRIL, 1939

Coal
Convention
and
Exposition
Number



There never was a power source, underground or above, more completely reliable than the "steel mule" Mr. Edison invented—the steel-alkaline battery. In all types of mines, working under any shift system, it provides locomotive power that insures uninterrupted haulage. A careful study of haulage conditions in a typical mine clearly showed that the Edison steel-alkaline battery keeps gathering and tramping more nearly continuous, with production up as much as 17%!

This surprising fact is due to several happy characteristics exclusive with the Edison: High average capacity throughout its long life. No time out of service due to sudden failure. Ability to withstand the slam-bang treatment, the overcharge and over-discharge of mine service. Because it is the only battery constructed of steel, it is the only one to offer these great advantages. In addition, it offers 2 to 5 times longer service life. Write for information.



EDISON



STORAGE BATTERY

DIVISION OF THOMAS A. EDISON, INC.

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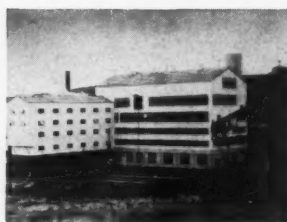


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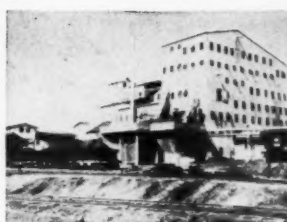
2 PAGES FROM THE RECORD of Economical COAL PREPARATION



Buckeye Coal Co., Nemacolin, Pa., Plant. 650 tons per hour, 4" x 0" Bituminous.



Pittsburgh Coal Co., Champion No. 1 Plant. 650 tons per hour, 4" x 0" Bituminous.



United Electric Coal Cos., Duquoin, Ill., Plant. 700 tons per hour, 4½" x 0" Bituminous.



United Electric Coal Cos., Buckheart, Ill., Plant. 400 tons per hour, 4½" x 0" Bituminous.



Lehigh Valley Coal Co., Dorrance, Pa., Plant. 400 tons per hour, egg to barley Anthracite.



Island Creek Coal Co., Holden, West Va., Plant. 425 tons per hour, 5" x 0" Bituminous.



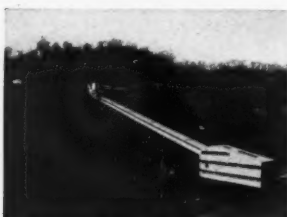
Franklin Co. Coal Corp., Royalton, Ill., Plant. 270 tons per hour, 3" x 0" Bituminous.



Northern Illinois Coal Corp., Wilmington, Plant. 435 tons per hour, 3½" x 0" Bituminous.



American Rolling Mill Co., Nellis, West Va., Plant. 225 tons per hour, 4½" x 0" Bituminous.



Koppers Coal Co., Kopperston, W. Va., Plant. 400 tons per hr., (800 ultimate.) Bituminous.



United Electric Coal Cos., Liverpool, Ill., River Loading Terminal. 400 tons per hour cap.



Pittsburgh Coal Co., Negley, Ohio, Plant. 250 tons per hour, 4" x ¾" Bituminous.

Koppers cleaning plants already installed have sufficient capacity (on a full-time basis) to wash over 20% of all the coal mined in this country. Rheolaveur launder installations alone could on the same basis wash over 10% of the total United States production... and a quarter of this could be dried in the Koppers Carpenter driers now in service. Over one-half of all the cleaned coal charged to coke ovens today is washed in Koppers-Rheolaveur plants.

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Coal Tipples · Coal Cleaning Plants · Coal Screening and Crushing Plants · Koppers-Rheolaveur Coarse Coal and Fine Coal Launderers · Menzies Cone Separators · Koppers-Battelle Fine Coal Launderers · Wedge Wire Screens · Carpenter Centrifugal Driers · Koppers-Birtley Dust-ers · Retarding Conveyors · Car Hauls · Rotary Dumps · Weigh Baskets · Refuse Disposal Equipment.

Koppers-Rheolaveur Service covers all phases of coal preparation and handling, from the modernizing of existing plants with a cleaning unit; a centrifugal drier; a heat drier; etc., to the design and construction of complete coal tipples, coal preparation plants, power plants, warehouses, machineshops, offices, tramways and refuse disposal installations. Koppers-Rheolaveur offers the convenience and economy of one negotiation, one organization, and one responsibility... from the original survey, analysis, plan and design to the complete construction and initial operation of the installation.

Koppers Products for the Mining Field: TREATED TIES, TIMBER, ETC. . . . AR-MOORED TIES . . . COAL CLEANING EQUIPMENT . . . BOILER AND POWER PLANTS . . . FAST'S COUPLINGS . . . FLOTATION OILS . . . FIRE HYDRANTS . . . PISTON RINGS . . . ROAD MATERIALS . . . ROOFING MATERIALS . . . WATERPROOFING MATERIALS . . . CREOSOTE

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TO VISIT THE**



**EXHIBIT
COAL MINING
EXPOSITION
APRIL 24-28, 1939
CINCINNATI**

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"GELOBEL" A A true gelatin-type permissible. Similar in character to permissible gelatins now sold, but has greater strength and better fumes.

"GELOBEL" B A new, semi-gelatinous permissible with properties different from any other permissible now sold.

"GELOBEL" C A high cartridge count, semi-gelatinous permissible with improved plasticity.

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E. I. DU PONT DE NEMOURS & CO., INC.
EXPLOSIVES DEPT., WILMINGTON, DEL.



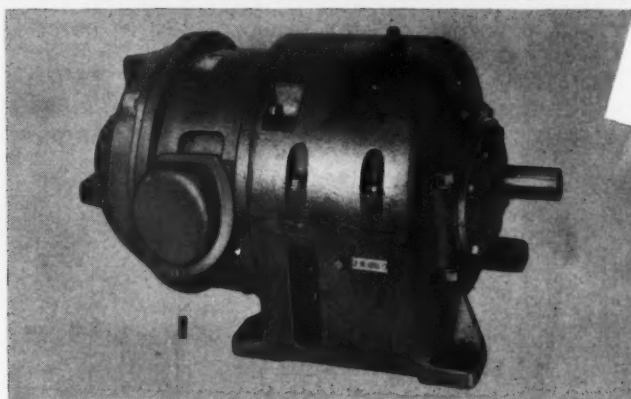
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IN 1938 — Westinghouse showed the latest in underground power conversion equipment — the new Ignitron Rectifier Substation. 10 of these units are now at work reducing power conversion costs in coal mining service.

IN 1939 — Westinghouse is again showing equipment that assures dependable, low-cost operation. The brief descriptions given here of some of the equipment on display will be amplified by engineers in our booth.



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2. CAPACITORS — Capacitors quickly earn their cost by improvement in voltage regulation and reduction in power bills. For mining service, use Westinghouse fireproof units, individually protected by boric acid fuses.

Westinghouse

the Mining Congress



3. FAN-COOLED CS MOTORS

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SEE these typical Westinghouse products at our exhibit in Booths 508 to 514 at the Mining Congress. Ask about design, construction and operating performance in relation to your own requirements. Or, if circumstances prevent your attendance at the Congress, see our local representatives for complete data, and assistance in applying Westinghouse equipment to your specific problems. Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

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Mining Equipment



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What is being accomplished with CARDOX at so many mines can, no doubt, also be accomplished for you. A survey and test shots can be made without cost or obligation to you, and our engineers are able—ready—and anxious to serve you.

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Depositing Coal in Mine Car



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CINCINNATI
BOOTH No. 618

The Timken Roller Bearing Company has continually improved the tapered roller bearing. We have been manufacturing and applying these bearings for more than 40 years. During this time upwards of 450,000,000 TIMKEN Tapered Roller Bearings have been applied to automobiles, motor trucks, trailers, tractors and all kinds of industrial machinery. Millions of them have gone into mine cars, mine locomotives, belt conveyors, hoists, loading machines, screens, mine motors and other kinds of equipment.

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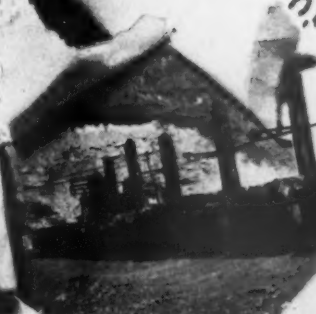
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For the evidence see Exhibit 322 at the American Mining Congress, April 24th-28th, Cincinnati Music Hall.

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- 6**
BASIC ADVANTAGES
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 - Reduced Power Consumption
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Testify to the economy of O-B product performance

America's model mines, as selected each year for the last eighteen years by Coal Age, have a number of things in common. Significant among these is their unanimous selection of O-B equipment!

Of course, we're prejudiced! But we believe, and we think you will agree with us, that when the winners of the model mine award, as well as countless other well-managed operations, select O-B materials to do their job right—it's a potent testimonial to the "performance-ability" and basic economy of these products!

Remember to drop in at O-B's red and white exhibit, spaces 500, 504 and 506 at the American Mining Congress, April 24-28. You'll find a warm welcome and have a chance to examine some of the newer O-B products that will take their places in model mines of the future.

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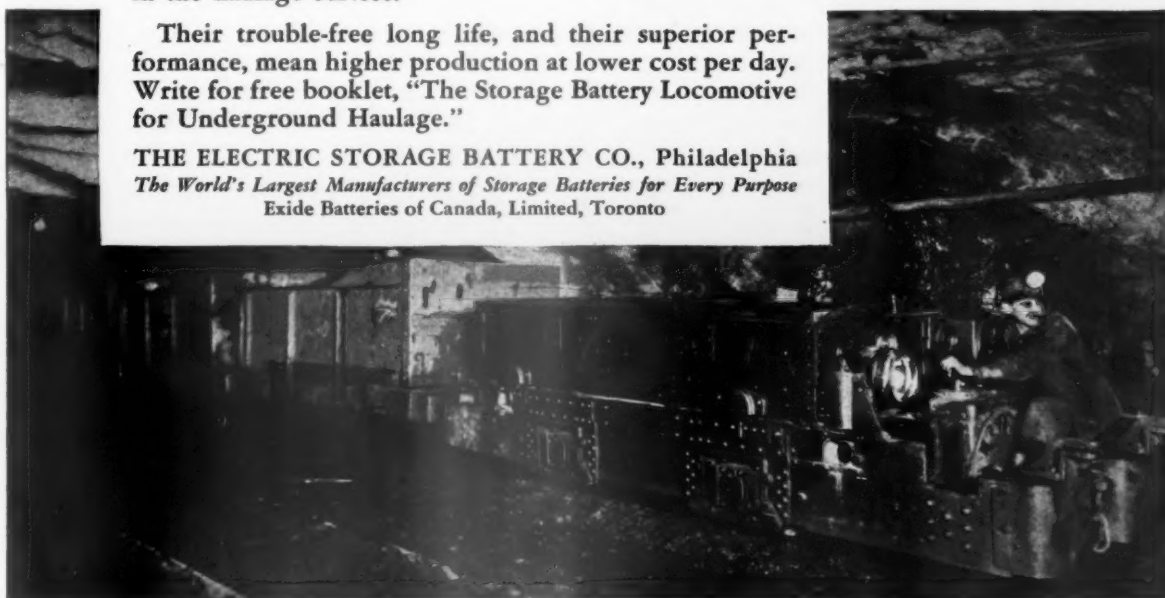
The reason lies in the great power these batteries can deliver when needed, in their sustained voltage which assures good locomotive speeds hour after hour, and in their dependability which guards against interruptions in the haulage service.

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MINING CONGRESS JOURNAL

Vol. 25

APRIL, 1939

No. 4

+

"A Reunion Which Pays Dividends"

Progress in coal mining and cleaning will again be on parade within a fortnight when the American Mining Congress holds its 16th Annual Coal Convention and Exposition in Cincinnati.

Characterized by R. L. Ireland, Jr., chairman of the Congress' Coal Division, and an outstanding leader in the industry today, as "A RE-UNION WHICH PAYS DIVIDENDS," coal men fully recognize the value of these meetings as the best place to obtain a comprehensive view of what other operators are accomplishing and of the forward strides made by manufacturers of modern mine equipment. Full details are outlined on pages 35 to 50.

Don't miss this golden opportunity to boost your mining I.Q. and to aid your industry in formulating plans for coal's comeback!

+

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Opinions expressed by authors within these pages are their own, and do not necessarily represent those of the American Mining Congress

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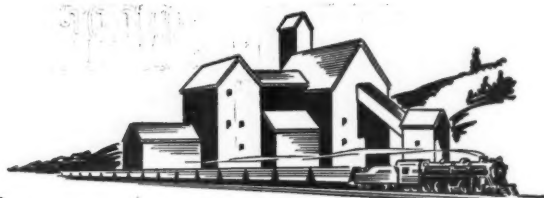
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David D. Moffat, Vice President

Donald A. Callahan, Vice President

Julian D. Conover, Secretary



Have We No Vision?

THERE may be many who have a conception of what the future of gold is to be, but as yet few have publicly ventured an opinion.

At this time gold is demonetized more effectively than was silver by the Acts of 1873 and 1893. Today this nation and, generally speaking, the world at large is on a managed currency basis.

Senate Bill No. 1684, introduced by Senator King, of Utah, rests quietly in the basket of the Senate Committee on Banking and Currency. This proposal to cease borrowing to buy gold; to pay for future offerings in gold coin or gold certificates; and to permit the holdings of gold coin or gold certificates by the public, is extremely moderate in its purpose.

It would seem that all too few of our responsible public servants comprehend the present trend away from sound money and toward the printing press. Every day adds to the stock of demonetized gold put out of service by what may be termed a decent burial. Every day adds to stocks of gold being made practically useless—both to this country and to those foreign countries whose domestic commerce is being robbed of its medium of exchange and whose power to purchase the product of American labor is being reduced to the ancient and clumsy system of barter. Every day we are getting further away from the metallic money base which has always been the strength of both domestic commerce and international transactions.

Without a metallic base there is no limitation of currency issues which, if not properly limited, are headed toward the value and uselessness of repudiated German marks. Without a standard base for currency issues and exchange transactions, other nations of the world may well adopt other standards, such as surplus commodities or products of individual countries, and which could easily render our gold stock of no value in international transactions.

The King bill is an effort in the right direction—only a drop in the bucket, true, but there must be a first drop if the bucket is ever to be filled.

J. H. Cresswell

MINING CONGRESS JOURNAL

Vol. 25

APRIL, 1939

No. 4

Richard J. Lund, Editor

STRATEGIC MATERIALS STOCKS

AT LONG last it appears that the nation's legislators have recognized the need of supplementing our heavy national defense program by providing for stockpiling of strategic materials of vital importance to armament manufacture in time of emergency.

The Thomas bill (S. 572), authorizing the War and Navy Departments to spend \$40,000,000 during the next four years in acquiring stocks of strategic materials, has passed the Senate, and a companion bill now awaits action in the House. The original bill reported by the Military Affairs Committee called for an expenditure of \$100,000,000, but this sum was reduced by the Byrnes amendment (passed by the close vote of 33 to 31), purportedly to conform with the wish of the President to hold expenditures in the first year to \$10,000,000. Senator Thomas hastened to insert in the record a memorandum that the larger amount for the four-year period would be vitally needed to provide adequate stocks of the materials, and that to the knowledge of the War Department, the President's advice to the Assistant Secretary of War referred only to budgetary limitations during the first year. It is not improbable that the House will make the larger sum available for the four-year period and that the Senate will concur. Certain it is that even a six-months' supply (considered a bare minimum for needed insurance) of such materials as tin, manganese, tungsten, nickel, chromite, mercury, vanadium and rubber would require the larger sum.

Inclusion of the "Buy American" clause in the Act, although reacting to lessen amounts stocked and to delay deliveries, has commendable aspects. Some of the minerals included in the strategic class exist in sufficient quantities within our borders to make it desirable to encourage their development at a reasonable premium above world prices. Moreover, provision is made in the Act for further search for and exploitation of deficient minerals by the

U. S. Geological Survey and Bureau of Mines, the sum of \$500,000 per year being authorized for this work over the four-year period.

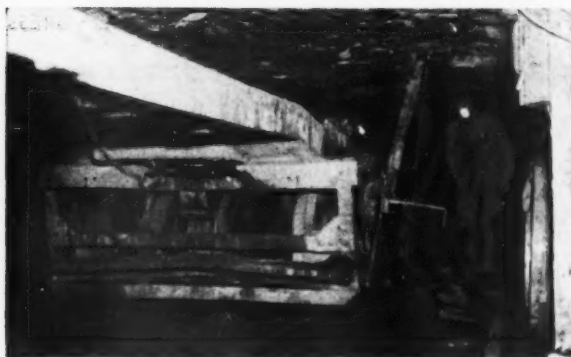
There is no doubt whatsoever that other world powers for some time have been laying up large stocks of all raw materials necessary for defense purposes, and it is most essential that nothing interfere with completion of a similar program now under way in the United States.

DEADLOCKED NEGOTIATIONS

AS WE go to press, a shut-down faces the great bituminous coal mining industry of the Appalachian area as a result of deadlocked negotiations over a new wage contract. Conferences between operators and miners in New York since March 14 have resulted in an apparent stalemate. Miners are asking for a six-hour day and five-day week, an increase of 50 cents per day in wage rate (from \$6.00 to \$6.50), a guarantee of 200 working days per year, a two-weeks' vacation with pay and various improvements in working conditions. Operators are countering with the proposal of a cut of 50 cents per day in basic wage rate and retention of the present 35-hour week.

The operators, with Charles O'Neill as spokesman, point out with reason that if the industry is ever to return to its former healthy condition, the cut in labor costs is essential. Demands of the miners would cost hundreds of millions of dollars annually above present costs, and would bankrupt the industry in no time at all. What the industry needs is lower production and transportation costs to permit expansion of markets, and a reasonable approach to the problem of unfair competition from other fuels and government-produced hydroelectric power.

It is reported that coal stocks above ground comprise more than a month's supply, so consumers have no cause for immediate concern. Past experiences during protracted shut-down periods, however, when markets comprising large tonnages have been lost to competitive fuels, should be a lesson to all concerned in the negotiations—particularly to the miners with their somewhat visionary demands. Increases in wages won by the union in the past at the expense of lessened annual incomes have proved to be hollow victories. It is greatly to be hoped that labor will see the entire situation in its true light at a very early date, and that the threatened shut-down, if it materializes, will be of short duration.



3-drum hoist of entry loader exposed when mine cars have been pulled out from under boom

New Methods of ENTRY DEVELOPMENT

in Thin Coal Seams

● *Combined Use of Entry Loader and Mobile Conveyor Has Speeded Development and Reduced Costs*

By T. F. McCARTHY

General Superintendent
Clearfield Bituminous Coal Corp.

THE necessity of rapid entry development in thin seams, where rock must be brushed for entry height, continues to be a very serious problem, and continued study and experiment are being carried on by the manufacturers and operators in an effort to develop equipment or methods to do this work speedily and at a proper cost.

As can be expected, hand methods of development are slow; moreover, the labor entailed in the work of drilling and loading out rock by hand methods is undesirable to the great number of miners, and it is very often extremely difficult to get miners who will accept this class of work.

In attempting to work out a satisfactory development technique, we have, in past years, tried out in the mines of our corporation a great many different types of equipment and different methods. Where speed of entry development is essential it is necessary that the air courses, in which coal only is extracted, be driven simultaneously with the entry in which both coal and rock are taken alternately. Furthermore, if the faces of the entries and air courses are to be kept together, in order to maintain good ventilation at the face and provide sufficient car storage for the entry and air course units, it would require that the air course unit convey the coal on each set-up a distance equal to the combined car storage requirements of both units, which is a minimum of about 200 feet. This distance represents the so-called non-productive investment requirement of equipment for this type of installation.

The use of the conventional shaker or chain conveyor in loading out the coal in entries and air courses has always proven satisfactory. However, disadvantages of their use have comprised the cost of moving this equipment ahead, the space requirements for storage of conveyor pans, conveyor

chains, etc., and the problems of working out a method to load out the rock brushed in the entry at the same time that coal is being loaded from the air courses. Another factor which complicates the problem of rock loading in entries is the desirability of brushing bottom rock for entry height. Where bottom rock is shot, it is desirable that the rock brushed be limited to the entry only. And where the development system requires that cars must be stored in cross-cuts and air courses, this method calls for additional brushing in the entrance to cross-cuts, to grade storage tracks, and also over the entire storage requirements where car height is required.

Tried Several Entry Development Systems

Some of the systems of entry development and the equipment that we have tried out are described in the following paragraphs.

In entries where mining requirements and roof conditions would permit its use, the entry was driven wide enough to gob the rock brushed from the entry. In top-shot entries, where seam height did not permit car storage

in cross-cuts or air courses without additional brushing in them for car height, a 300-ft. conveyor, with about 100 feet of this unit paralleling the entry track for car storage, was set up in the entry, and the entry was advanced in the coal for a distance of approximately 200 feet. This conveyor was then removed and placed in the air course, and by the addition of a cross-conveyor in the cross-cut, the air course was then advanced an equal distance with the entry. During the time the air course was being advanced a crew of rockmen were started in the entry to shoot and gob this rock by hand. Much the same system was used in entries where bottom rock was taken, except that the entry was widened out so that a bench could be carried at the opposite side of the entry from where the rock was gobbled, in order to carry the conveyor at the level of the bottom of the coal seam.

We also used a mobile rock-loading machine, with a separate gobbing conveyor to gob this rock and eliminate hand shoveling methods. The use of this type of equipment could not be justified, however, because the gobbing operation required considerable and difficult hand shoveling, and the prob-

lem of moving and setting timber during the gobbing operation proved difficult.

Another system tried consisted of advancing the entry and air course in the coal with conveyors, then moving this equipment out of this particular entry to an adjoining one, and bringing in the mobile rock loader or a rock scraper to load out this rock. Because of the cost of moving conveyors in and out of the entries and the cost of rock loading by this method, which required that each individual car loaded be shifted before the next empty car could be placed, we found that we could not justify this method and could not gain any increase in speed over hand-loading methods.

Shaking conveyors which will convey both coal and rock in entry work were also used, but only in entries taking top rock. They were not very well suited to cases where bottom rock was brushed, as the conveyor was carried on a bench at the side of the brushing, and this method required that all of the rock shoveled be lifted and moved to the one side of the entry into the conveyor. Due to the severe nature of this service on shaker conveyors, and the fact that one man was required at the loading point, we found we could not justify the use of this type of equipment.

In all our experiments with rock-loading equipment which required continuous hand shoveling of rock, we were having difficulty in securing men who would continue at this work and men who could produce at such a rate as to justify their employment.

Fundamental Requirements to Solve Problem

With the years of experiment in attempting to satisfactorily solve this problem of entry development, and secure equipment which would give us rapid development at a cost to justify its use from an investment standpoint, the following fundamental requirements were necessary:

Equipment must be self-contained, portable, easily and quickly set up, simple in construction, low in first cost, and have a low maintenance cost.

It must be adaptable to load coal and rock alternately, and the change from coal to rock should be made without interference to independent units driving the air courses.

It must be adaptable to load either top or bottom rock.

When used in loading either coal or rock on contract rates, the crew must earn good wages.

The nature of the work must be such that it would appeal to the workmen.

The combined cost of coal and rock and the speed of development must justify its use.

Hand Preparation and Loading Methods Satisfactory

Due to the thin seam, narrow entry width, the small tonnage per cut, and the requirement that a certain amount of hand cleaning at the face is necessary, it was felt that hand methods of cutting, drilling, shooting and loading at the face were satisfactory, provided: (1) that mechanical means were used in conveying the coal from the face to the loading point in the entry, (2) that the loading operation could be carried on without the necessity of car trimming or car shifting at the loading point, and (3) that the type of equipment would not require that one member of the crew be continuously employed in operating the equipment. It was necessary that this same equipment load out the top or bottom rock mechanically, and practically eliminate all hand work.

With this analysis of the problem and, in particular, the necessity of providing equipment that would satisfactorily load either top or bottom rock in thin seam entry development work, the conclusions were that an adaptation or improvement on the scraper equipment would best solve this loading problem.

Improved Entry Loader Developed

The Goodman Manufacturing Company, in its entry loader, had a self-contained, self-propelling track drive unit, and it required only the development of means to provide car storage with automatic loading and car trimming, and improvement in the con-

trol equipment to fit this unit to this problem. As a result there has been developed the Improved Entry Loader, which is doing this job in a satisfactory manner.

The design features of this unit are as follows:

The drive unit is a self-contained, self-propelling track-mounted unit, containing, as required, either a two- or three-drum d.c. motor-driven rope drive.

The top of the drive unit serves as the approach pan and a part of the loading chute.

Attached to the drive unit is an extensible, sectionalized unit that extends out by the drive section far enough to provide car storage for a complete cut of coal, and has openings properly spaced and proportioned to the length and width of the mine cars in use, to provide automatic loading and car trimming.

Extensible sections can be added to permit storage of a greater number of cars if this is desired.

The extensible section is of such width that it spans the width of the mine car, and is supported from the mine bottom by means of adjustable legs that permit its height to be regulated to trim the mine car properly.

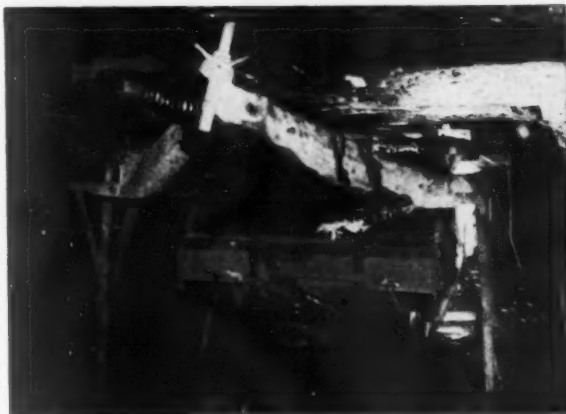
The cycle of operation with the entry loader is as follows:

At the beginning of a coal cycle, as shown by Fig. 1, the approach apron of the loader is located just out by the edge of the brushing.

If a cross-cut A is not driven during the previous cycle, or is not driven by the unit driving the air course, this cross-cut is driven to establish ventilation, and the entry is then advanced in the coal for a distance of approximately 100 feet.

As the entry is advanced, one to

View of entry loader from outby end of boom, showing scoop discharging rock into mine car



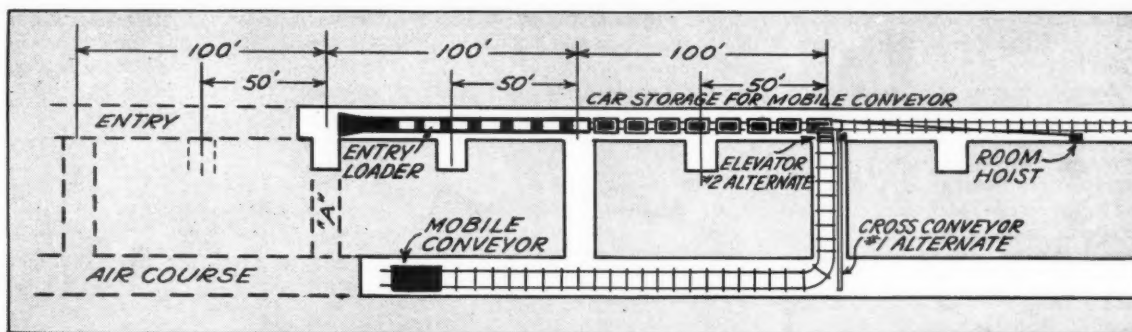


Fig. 1. Diagram showing methods of driving entry and air course. Scraper loader advances entry taking coal and rock, also turning room-necks and cross-cuts at 50' centers. Mobile conveyor advances air course and completes cross-cuts. #1—Mobile conveyor unloads directly into mine cars on the entry. #1 alternate—Mobile conveyor unloads into a cross conveyor in the air course. #2 alternate—Mobile conveyor unloads into an elevator on the entry in top shot entries

three cuts are taken out of room necks for the room retreat work.

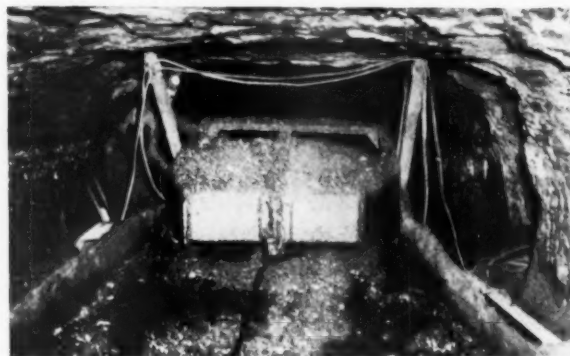
Preparation and Loading Cycle

Under certain conditions and, in particular where jack hammers are used in drilling both coal and rock as the entry is advanced in the coal, the holes for shooting top or bottom rock are drilled three abreast on centers from 3 to 4 feet. These are inclined at an angle of from 45 to 60 degrees outward from the advancing face, and are drilled by the crew during the coal preparation cycle, thus insuring that rock loading can begin immediately after the coal cycle has been completed.

In the coal cycle, inasmuch as the unit contains storage for a complete cut of coal, this amount can be loaded without interruption. Coal is loaded into the scoop by hand, following which it is conveyed to the loading extension. As the scoop passes over the openings in the extension the coal drops into the mine car until it is filled, the scoop passing progressively to the next openings until the cut is loaded out. Where hand cleaning is necessary at the face, the first opening in the extension is covered with a detachable cover, and on completion of the loading of the coal this cover is removed, and the impurities thrown back at the face are then loaded out. The reason for using the first opening is to prevent impurities from contaminating the coal in the other cars as the scoop passes over them. After the coal is loaded out, the preparation cycle can be started; and during the interval when cutting, drilling and shooting are being performed the car change is made.

In the rock loading cycle, two rounds of top holes, or about 8 feet of entry, are shot for each loading cycle. This 8 feet of rock usually

Scoop loaded with coal moving over approach apron or elevating section of scraper loader



loads out the trip of cars under the unit, and during the time the rock holes are being tamped, fired, and the top rock trimmed for safety, the car change is made.

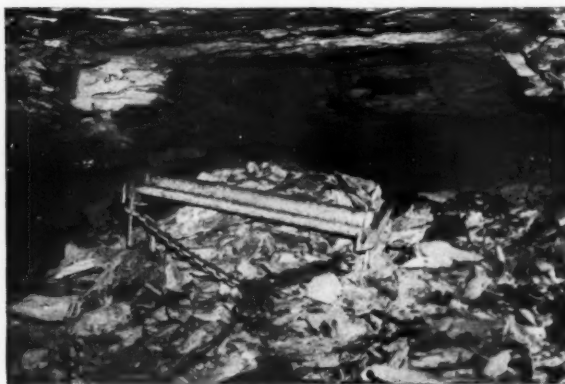
In seams of approximately 3 feet in height, and entries of 10 to 15 feet in width, the crew is composed of two men who load out from two to three cuts of coal per shift. Tonnage outputs, over a two-week period, range from 10 to 13 tons per man-day. In rock loading this same crew performs all the work in shooting and loading out the rock, and continues the cycle until the rock work is finished. Advancement in rock is governed by the

character and thickness of the rock, how well it shoots, and the effectiveness of the car servicing.

To facilitate the rock loading, a special, large-capacity, self-loading scoop is used that does not tend to drag the rock towards the face when the scoop is hauled back over the pile. Special control equipment is also used to control the travel of the scoop over the width of the entry, in order to facilitate loading and cleaning up the entry.

Special Drill Rigs Developed

As inclined holes are used in both top and bottom rock shooting, and as



Scoop loading top rock

DATA - COAL CYCLE

Period of Advance Month—Days	Coal Cycle TOTAL		Advancement Coal Cycle		Advancement of Entry Yards	Hrs. Maintenance Loading Mach., Drill Blower, Compressor, etc.	Hrs. Allowance Cutting Rolls (1 Hr. per cut Bottom Rolls)	Yards of Rib Yardage Paid in Entry for Narrow Work†	Total Dead Work Hrs. Not Including Rib Yardage	No. Cuts Coal in X-Cuts and Entry	Total Tonnage	Tons Coal per Man-Day On Coal
	Man Hrs.	Man Days	X-Cuts	Entry								
1/10-1/18	178	25.4	48	105	35	2	2	26	4	25	293.90	11.57
1/18-2/ 1	252	36	48	108	36	22	19	24	41	26	313.95	8.72
2/ 1 -2/ 9	170	24.3	48	111	37	1	9	30	10	19	265.85	10.94
2/ 9-2/21	201	28.7	48	111	37	6	19	20	26	25	290.65	10.13
2/21-3/ 1	161	23	48	111	37	1	1	20	7	25	258.50	11.24
3/ 1-3/10	177	25.3	48	108	36	4	5	10	9	25	262.75	10.38
3/10-3/18	137	19.6	48	105	35		9	10	9	25	264.55	13.5
3/18-3/27	187.5	26.8	48	105	35	2	4	8	6	25	295.55	11.03
3/27-4/ 6	169	24.1	48	105	35		2 ^a	22	2	24	258.05	10.74
4/ 6-4/18	181	25.9	48	105	35	1	13	30	14	26	261.85	10.11
4/18-4/27	201	26	48	108	36	2	4	30	6	21	264.55	9.22
	2,014.5		528	1,182	394	47	87	230	134	266	3,030.95	10.55
	287.8 Man-days			1.710								
	143.9 Shifts			Coal Advance								

† Rib Yardage paid when entry was 12' or less in width.
^a 2 hours extra rock—not paid for cutting rolls.

DATA-ROCK CYCLE

Period of Advance Month—Days	Total Man Hrs. Rk. Ldg. Cycle Including Dring., Shootg., Movng Equip. Trk. & Bondng*	Man Hrs. Shooting Trimming Loading	Man Hrs. Maintenance Other Equipment	Man Hrs. Drilling Allowance	Man Hours		Man-Hours Moving & Setting Equipment	Yards Advance in Rock	Thickness (inches)
					Track	Bonding Trolley Wire			
1/10-1/18	112.90	49.5	7.5	7.9	23.5	11	13.5	35	30
1/18-2/ 1	112.60	50.0	12.0	8.6	22.0	6	14.0	36	32
2/ 1 -2/ 9	103.65	50.5	4.0	9.15	22.0	7	11.0	37	32
2/ 9-2/21	153.77	61.0	18.0	9.77	36	8	21.0	37	31
2/21-3/ 1	134.45	50.0	15.0	9.45	28	9	23.0	37	32
3/ 1-3/10	123.55	54.5	12.5	9.55	24	7	16.0	36	32
3/10-3/18	112.45	48.0	11.0	9.45	21	10	13.0	35	32
3/18-3/27	108.65	56.0	2.0	9.15	22.5	7	12.0	35	30
3/27-4/ 6	104.72	54.0		9.72	22	9	10.0	35	32
4/ 6-4/18	112.65	59.0	2.0	9.65	24	8	15.0	35	33
4/18-4/27	102.50	61		8.50	11	7	15.0	36	32
	1,289.0	588.5	84.0	100.89	256	89	163.5	394	31
Averages—Man Hours per Yard of Rock 3.28		1.49	.213	.277	.65	.226	.415		

* Total Man Hours shown on tabulation includes 108.9 Man Hours on rock drilling that was performed during coal cycle but included in rock loading cost. Total Man Hours also includes extra labor of 174 Man Hours on Track, Trolley and Bonding performed by additional men working with regular crew.

COAL AVERAGES FOR PERIOD:

No. rib yards paid per man day.....	.8
Hours allowance per man day.....	.465
Cuts per man day.....	.95
Depth of cut.....	6.43'
Tons per shift of 14 man-days.....	21.1
Advance per man-day total advance including crosscuts....	5.96'
Advance of entry per coal man-day.....	4.12'
Cut of coal per man-day.....	.925
Tons coal per cut.....	11.4

GENERAL NOTES:

No. electric blasting caps per linear yard.....	2.39
No. sticks 60 per cent dynamite per linear yard.....	4.53
Average width of top rock shot (feet).....	12
Total rock material removed (cu. ft.).....	39,000
Total man-hours rock loading cycle.....	1,290
Cu. ft. of material per total man-hour of labor.....	30
Actual advance of entry per man-day, excluding drilling and extra track labor, during rock loading cycle (feet).....	6.95
Advance per man-day, excluding all Track, Bonding, Trolley Wire (feet).....	9.83
Man-days by regular crew—coal and rock.....	4.32
Feet of advance of entry by regular crew per man-day... Per shift..... Per 3 shifts.....	2.58 5.16 15.48

the headroom available is limited in a three-foot seam, it required the development of special drill rigs for both jack hammer and electric drills to insure uniformity of the angle and depth of holes, and to speed up this work. The use of these special drill rigs makes it possible for one man to drill these rock holes.

As a general conclusion in thin seam and narrow work, we find that the use of this type of equipment in the coal loading cycle, by reason of the elimination of the man normally required at the loading point when conveyors are used, makes it possible for a crew of two men to do almost the same work as a crew of three men. In the rock loading cycle, the machine operator can perform the loading operation and permit his helper to continue with the drilling and tamping of the rock holes, so that rock loading can be carried on almost continuously. This is made possible through: (1) the elimination of the individual car change, (2) proper shooting of rock for loading, (3) proper illumination to follow the movement of the scoop, and (4) use of control equipment to regulate the travel of the scoop over the width of the entry.

The accompanying tables show production over a period covering approximately four months, in an entry taking top rock averaging 31 inches in thickness, with the coal seam averaging 40 inches in thickness and containing frequent bottom rolls. The seam is overlaid with a 5-in. bony parting that came with the coal and is loaded out in the coal cycle.

Track Extension

After the completion of the rock loading cycle, work on the track extension begins. To facilitate getting ties and rails in position from the cars and trucks on which they are brought into the mine, the extension is provided with a hinged drop section that drops down on the bumper of the mine car. Ties are loaded into the scoop and hauled into position along the roadway. The rails, when loaded on rail trucks, are attached together by means of a special attachment that permits all the rails required for one move to be moved together and be progressively detached in their position along the road. After this track material is hauled into place, the ties are placed in position and the rail spiked. The unit is then moved ahead, after which the rails are bonded and the trolley extended. In laying heavy road, a third man is required to assist in this

work, because of the weight of the rail. The bonding and trolley extension are usually done by the mine's electrical organization.

Air Course Development

During the course of the development of the entry with the special coal and rock loading apparatus, with its self-contained car storage which permits either coal or rock to be loaded, it is necessary that a mechanical means be used to drive the air courses in coal at the same time. To provide this unit with an independent car storage and loading point, a development method has been arranged which uses the mobile conveyor in air courses (Fig. 1).

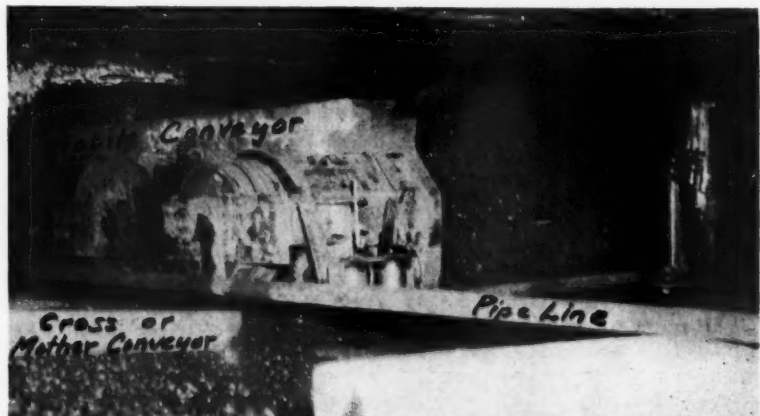
Due to the distance needed for car storage of both units, the use of the conventional conveyor requires that a minimum of 200 feet of conveyor be used to span the car storage requirement. This limits the actual development advance that can be made on each set-up, because of the limitation

in length that the conventional conveyor can be extended. Due to the weight of conveyor sections and the labor required in moving the conveyor ahead, the cost and time required for this work often offset the advantage of the use of conveyors.

Mobile Conveyor Described

A simplified method of air course development has been found in the use of the mobile conveyor. The mobile conveyor is a large-capacity, track-mounted, sectional conveyor that has its own self-propelling rope drive for tramping it between the face and the loading point. This same drive also actuates the conveyor on the mobile unit by means of suitable clutches. As the coal is loaded into the rear of the conveyor the drive is used to progressively move this coal ahead until the conveyor is loaded. It is then trammed to the loading point and transferred to the outside transportation by a member of the crew. The

(Continued on page 79)



Mobile conveyor discharging into cross conveyor in back entry. Pipe line rests on cribbing in foreground



Men loading coal into mobile conveyor. Loading gates are dropped down, but due to position of the men the gates cannot be seen. Had conveyor been at the face, gob would not have been in the way, and the men would have been shoveling from the sides

Island Creek's Refuse Disposal AERIAL TRAMWAYS

- *Their Use Has Simplified Conditions at Preparation Plants, Made Highways Safer and Cleaner, and Greatly Reduced Former Delays in Disposal Service*

By F. C. MENK
General Engineer
Island Creek Coal Co.

AS LATE as five years ago most coal producers considered hand picking sufficient cleaning for preparing coal for marketing. At its best, hand picking never was very efficient, and seldom was an attempt made to clean coal smaller than 2 inches by this method. In fact, sizes smaller than 3 inches received very little benefit from this cleaning method. The mine operators, in their efforts to produce a salable product, used to urge their miners to exclude impurities from the coal at the face. This constant campaign to have all the coal loaded as clean as possible was probably responsible for the fact that in the days of hand cleaning, comparatively little refuse was brought out of the mine, and being only partially removed from the coal the amount of reject to be disposed of amounted to only about 2 percent of the mine output.

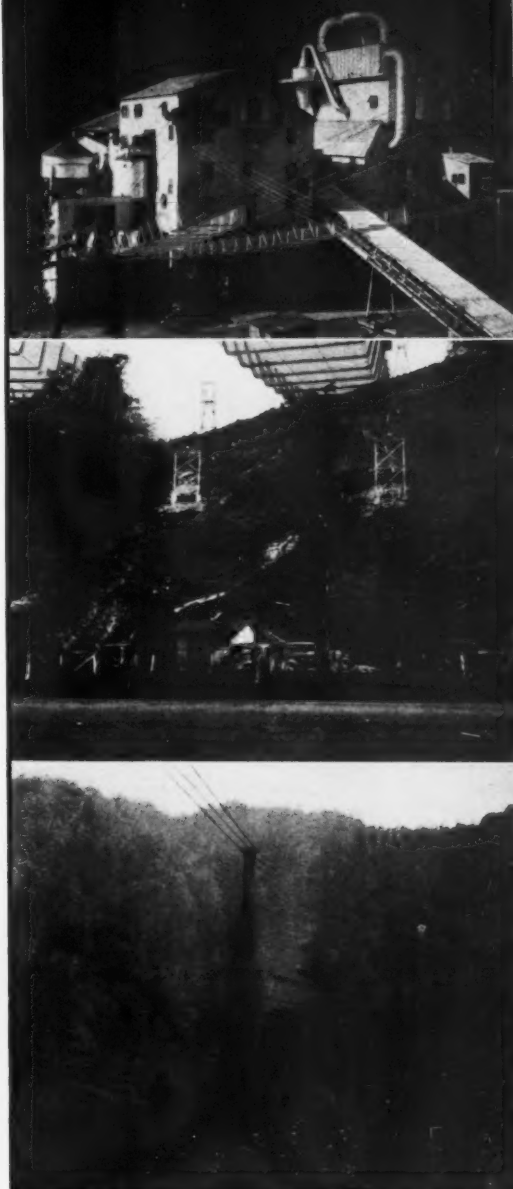
Amount of Reject Boosted by Modern Preparation

Conditions forced upon the industry by fuel substitution and the increased efficiency in the use of coal, together with the general business depression, necessitated a more thorough cleaning of the coal. All possible undesirable material such as slate, sulphur and

bone had to be removed from the coal. As the consumers of coal demanded better preparation and more uniform quality, mechanical cleaning plants were installed to remove all material heavier than a certain specific gravity. Mechanical mining has been responsible for again boosting the amount of reject material to quantities formerly thought impractical—in some cases to as high as 20 percent of the material mined.

At the Island Creek Coal Company the small amount of refuse produced in former years was readily and efficiently disposed of by trucks. As the amount of refuse and the quantity of bituminous content increased, refuse pile fires caused by spontaneous combustion became more frequent.

With the seven-hour day, refuse disposal had to be free from interruptions. In the case of the Island Creek Coal Company, excellent concrete roads provided trucking with the best conditions possible, yet delays from blocked railroad crossings and bad weather were frequent. The ever-increasing amount of refuse threatened to fill quickly all available dump space in the valleys, and it became imperative to find more distant dumping space, preferably away from the plants.



Aerial tramway at No. 1 mine

Top: No. 1 preparation plant with loading terminal of aerial tramway on left and guard screens over highway

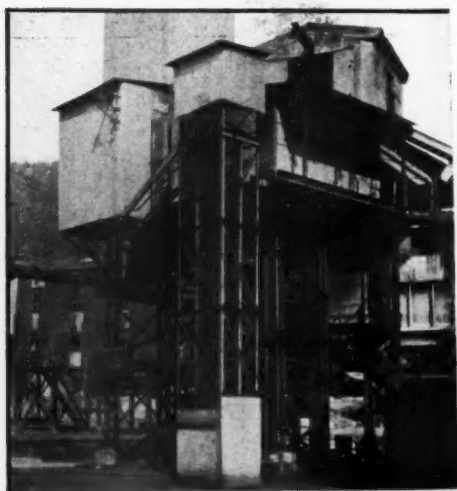
Center: View from loading terminal toward "breakover" towers located on point of a hill at beginning of dumping span

Bottom: Looking across dumping span toward the tail anchorage located near top of mountain. Tramcar dumping in foreground

Since the narrow valleys in the district are covered with camps and improvements, this could only mean taking the refuse up and over the hills.

Aerial Trams Solved Difficulties of Other Systems

At one of our mines we experimented with a self-dumping car, haul-



General views of aerial tramways
at the No. 7 mine

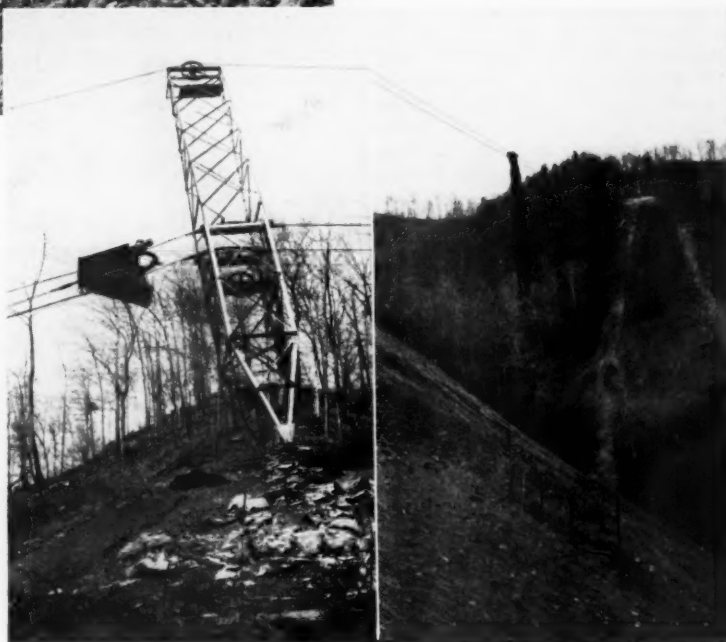
Left: Rear view of loading terminal tower. Skip counterweight tower and hoist in foreground; refuse bin and domestic coal bin in right rear

Below: No. 7 preparation plant viewed from breakover tower, showing tramcar traveling up incline span

ing refuse up an incline. This method had certain merits but was not successful, as rapidly spreading fires caused considerable trouble with the track, loss of time, and expense. The dumping space available to this disposal system was also very limited. Careful consideration of all factors involved convinced us that aerial refuse disposal was the solution of our problem. The mountainous topography in the district seemed at first a barrier to our plans, and in many instances it was difficult to find sufficient dumping area within economical tramming distance to justify the comparatively large first investment. Furthermore, the necessity of gathering all refuse to one point was another problem, since refuse systems at all of our tipples were laid out for disposal of the reject by truck; in this formerly suitable system, refuse was generally loaded near the place it was produced—usually at two or three points about a cleaning plant.

After preparing preliminary profiles over routes to areas which promised sufficient dumping space to justify the investment, manufacturers were called in, and each proposed installation was discussed with them separately. We gained liberally by their experience and advice.

To determine the type of plant most suitable to our needs, the first step was to establish the capacity required for our units. Since in our case we have a variety of refuse, ranging from dust at 30 pounds per cubic foot to slate at about 100 pounds per cubic foot, it was decided to determine capacity on



100 cu. ft. capacity tramcar entering pivoted and inclined breakover tower

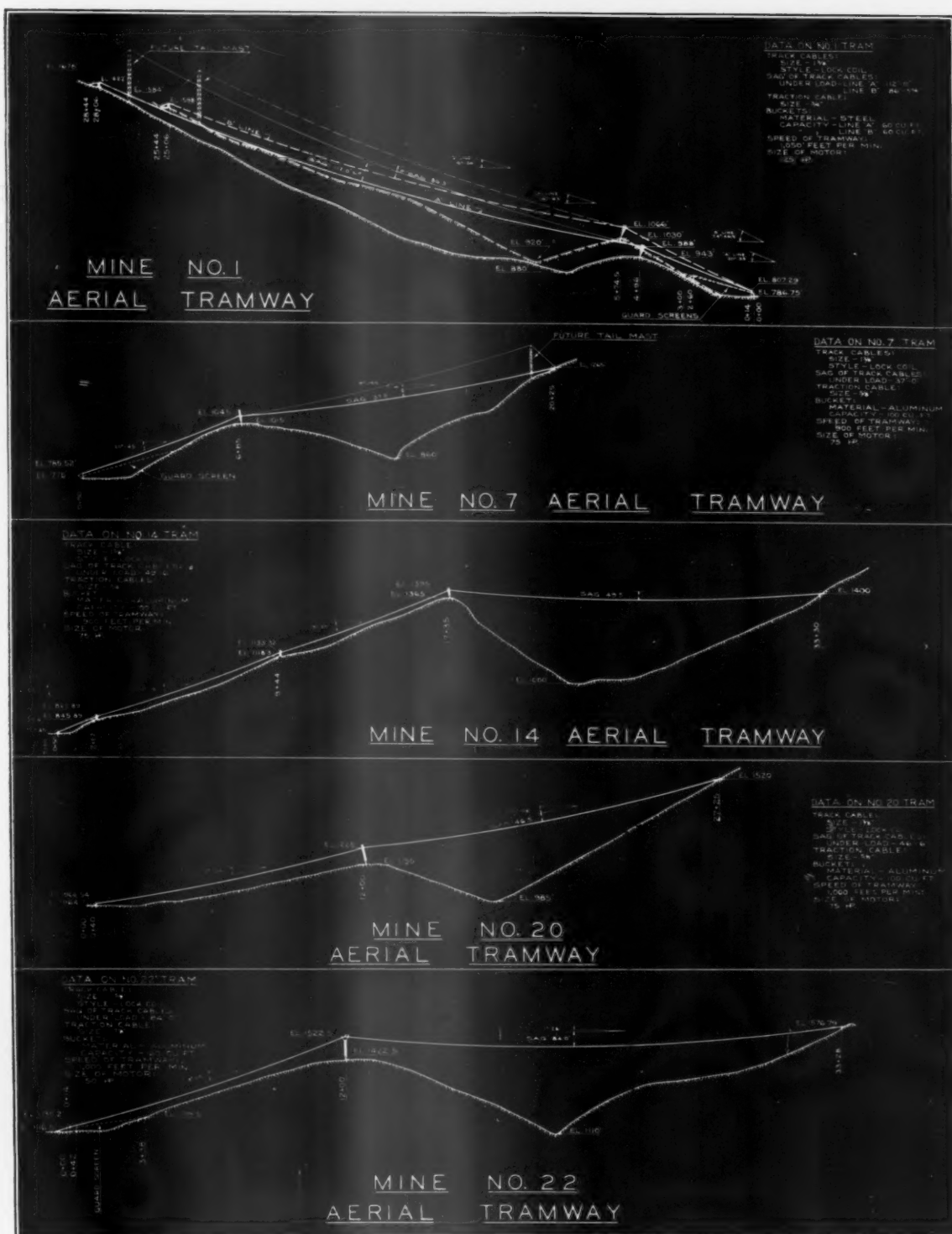
View along dumping span showing tail anchorage near mountain top and tramcar dumping in foreground

a cubic-foot basis rather than a weight basis, with a provision that the plants would be capable of handling the maximum load. This was desired to enable us to handle mine rock also. The topography—difficult at some of the sites chosen because of the steep, long inclines—was taken advantage of as much as possible, and the height and number of tower structures were reduced to a minimum.

Five Aerial Tramways Now in Use

We now have five aerial tramways in operation, of which four are of the single-car reversible type, operating over two parallel track cables, the car being propelled by an endless traction rope. All tramcars are of aluminum alloy, three of 100-cu.-ft. and one of 160-cu.-ft. capacity. The fifth tramway is of the two-car, double twin cable, reversible, spread-cable type. Because each of the two tramcars of this installation is of 60-cu.-ft. capacity and practically counter-balanced, they were constructed of heavier special corrosive-resisting steel.

In general, all our tramways consist of two parallel or twin-track cables of locked coil construction, which are kept at equalized tension. They are anchored at the loading terminal and tail anchorage end, and generally supported near the beginning of the dumping span over a floating or pivoted "break-over" tower.



Profiles of aerial tramways at mines of Island Creek Coal Co., showing construction details

Profiles along the centerlines of the tramways (see above) show the general arrangement. The break-over tower is pivoted to automatically com-

pensate for difference in track cable tension in the adjacent spans; it is also inclined so as to coincide with the resultant, and therefore acts as a

simple column, eliminating the bending stresses. In all our installations the break-over towers are of moderate height and are placed upon a ridge

located between the loading terminal and the tail anchorage, which is located high on a mountain side. This places the dumping span high over a valley.

In the span connecting the loading terminal and break-over tower, inclines of from 20 to 26 degrees or from 36 to 48.5 percent have to be overcome. Care must be taken that sufficient cable height is provided so that the sag in the span caused by the loaded tramcar will give sufficient clearance above the ground.

Design of Tramcars

The tramcars are designed so as to reduce the dead weight as much as possible and yet be of sufficient strength for safe operating. The six or eight wheels supporting them are of the tapered roller-bearing, double-flanged, cast steel type. The tramcar automatic door opening mechanism employed is either of the fixed dumping-point type, where a predetermined dumping point is set on a rotating screw bar, which is actuated by a gear train from the car wheels. When the dumping point is reached the screw mechanism trips the door latch, which permits the material to discharge at this point. The other tripping arrangement consists of a mechanism which opens the tramcar door when the operator reverses the direction of travel. Both systems have proved satisfactory.

The tramcar is propelled by means of a traction rope which is secured to the front of the car. It loops over sheaves at the tail anchorage, returns to and around the rope drive grip wheel located at the loading end and thence to the rear of the car. All sheaves are equipped with roller bearings. For the traction rope drive mechanism we preferred the grip-type wheel. This wheel is driven through gears from a slip ring motor equipped with an electric brake which is to be used only in emergencies. The service brakes are hand operated and are of the large diameter drum band type.

Electric Control Simplifies Operation

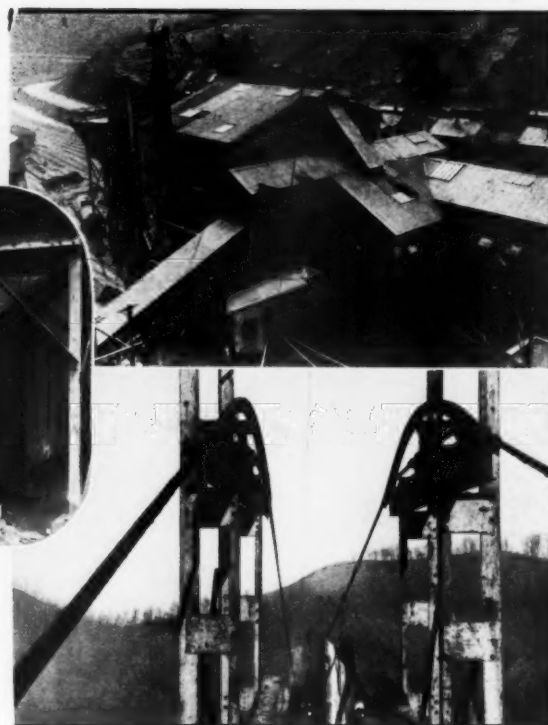
The electrical control mechanism is designed to provide for simple operation. The motor and thereby the tramcar is brought up to speed through a reversible drum controller. It is very important that the acceleration not be too fast. This is to avoid slipping the traction cable through the grips of the drive wheels. Limit switches, operating either from the tramcar position indicator or directly

Right: No. 14 preparation plant with tramway loading terminal in lower foreground



Above: Measuring hopper discharging into tramcar

Right: Looking from tramcar through breakover tower across the 1600 ft. dumping span



General views of aerial refuse disposal tramway at No. 14 mine

from the drive mechanism, are designed to stop the tramcar a safe distance from the hill at the tail anchorage; or, if on the way back, about 150 yards out from the loading terminal unless the operator bypasses the limit switch by placing his foot upon a dead-man control button which will permit him to land the tramcar at the terminal by means of the hand brake or by "plugging" of the motor. The electric brake is intended to operate only when the electric power is interrupted.

An additional safety device is provided by a centrifugal switch generally attached to the counter shaft, which cuts the power and, therefore, sets the electrical brake if for any reason the tramcar should run away or travel beyond its predetermined speed. Safety appliances protect the tramcar operation from most emergencies; about the only thing that is not provided against is the breaking of the traction rope.

The selection of the proper traction rope is of vital importance, as it must be flexible, have a large wearing surface, and resist abrasion. To prevent internal friction of the different strands and wires, these ropes require periodical saturation with a penetrating oil of low lubricating value.

Operating Cycle Outlined

All of our plants are semi-automatically controlled and require only one operator. The generalized cycle of operation is as follows:

While the tramcar is traveling out on the span, the operator, by pressing a button, starts the equipment designed to fill the measuring hopper. This operation is automatically controlled by a motor revolution counter, or a feeder-stroke counter, which will stop this equipment when the hopper has its proper load. If the operator discovers that insufficient refuse is available and the measuring hopper is not fully loaded, he can fill it to the desired capacity by pressing a bypass switch. After the tramcar is landed the operator pulls a latch which discharges the material from the measuring hopper into the tramcar. By moving the drum controller the tramcar starts out toward the dumping span and the operator repeats the loading cycle of the measuring hopper.

When the travel indicator shows that the dumping location has been reached, the operator stops and reverses the travel of the now dumped tramcar, which will come in practically without attention. However, when the tramcar gets to a position of about 150 yards outside of the loading

terminal, the operator must press his foot upon the dead-man switch to keep the limit switch through the electrical brake from stopping the tramcar at this location. He now checks the travel of the tramcar by either "plugging" the motor or by applying the hand brake almost simultaneously with the moving of the drum controller to land the tramcar properly. He then repeats the cycle.

The complete operating cycle is from $3\frac{1}{2}$ to 5 minutes' duration, depending on the distance of the tramcar travel. All our tramcars travel at a speed of 1,000 feet per minute or more, except two, where 900 feet per minute was used to limit the power required because of steep inclines.

Importance of Systematic Lubrication

Lubrication is held to a minimum by the exclusive use of roller bearings. However, when one realizes that all of our trams run in excess of 100 miles per shift, it is apparent how important it is to lubricate systematically. This must include also the tail sheaves which are located high in the mountains. The wear on the track cables is very slight, and with proper lubrication we may reasonably expect many years of service from them. The traction rope is subject to abrasive wear by friction at the grip wheel when accelerating heavy loads, especially where the incline is steep. At various times we have found it necessary to cut off several hundred feet of traction rope close behind the bucket, where fortunately the wear was concentrated. By feeding out reserve line carried at the front of the tramcar the life of the traction rope was greatly increased. We also have found it practical to splice new sections into the traction rope. After a short time in service, the splices could hardly be distinguished from the rest of the rope.

The power consumption is not as large as the size of the motors would indicate. The load changes continually with the inclination of the track cable, and for at least one-half of the cycle there is no power consumption.

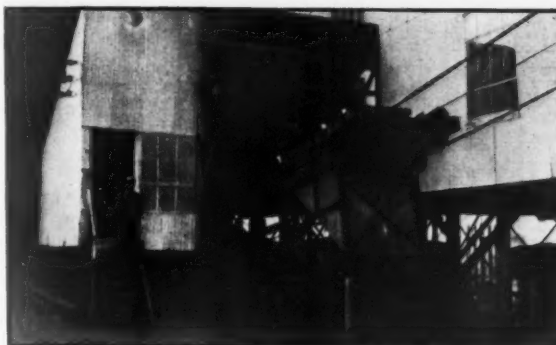
On the whole, aerial tramways are simple structures, although special conditions encountered at most installations introduce complexities. Real ingenuity is often required to overcome such difficulties in a practical and economical manner. An ideal installation would feed the refuse from a large storage bin directly into the tramcar. In most of our installations we were not able to do this. For instance, at our No. 7 plant the refuse

bin was adapted for truck loading, and is located on a narrow strip of land between the county road and the main line of the C. & O. Railway. The track cables cross the highway approximately at right angles and had to be fitted in between existing buildings to reach a favorable location across a spur and valley to a suitable point on the far hill. They also had to be elevated sufficiently to clear the county road

ing position (see accompanying views of No. 7 tram).

Foundations of Vital Importance

The foundations or anchorages are of vital importance. The loading terminal foundation is generally located so as to be easily supplied with concrete materials, and therefore can generally be of the gravity type. The



Tramcar leaving the No. 20 loading terminal

properly. The track cable anchorages, therefore, are in a tower about 30 feet above the ground level, and the foundation had to be designed to overcome the overturn and uplift stresses. In the design for this loading terminal, the contractor eliminated all intermediate conveyors between the feeder from the bin, located at a low elevation, and the tramcar, located approximately 20 feet higher and very close to the bin, by employing a counterweighted measuring skip, traveling between the feeder and the tramcar load-

tail anchorage, however, usually located high on the mountain and accessible only over rough, steep mountain trail, requires that the quantity of concrete be held to a minimum. In all our tail foundations we excavated and channeled along the proposed track cable location until we reached a suitable location in solid material. Then in this firm material and at suitable depth we tunneled to the right and left for a sufficient distance, and then installed in this excavation a heavily reinforced concrete beam to which we secured the track cable anchor irons. All the anchorage steel is also imbedded in concrete so as to protect it from deterioration. Each anchorage must be capable of taking care of cable stress of approximately 75 to 100 tons.

Practicable Design Features

General design features desirable in all installations are as follows: The operator should be so located that he can see all loading operations, that is, the loading of the measuring hopper as well as the loading of the tramcar. He also should be able to see the landing and leaving of the tramcar at the loading terminal. Though desirable, it is not necessary that he see the discharge point, as the position indicator shows the location of the tramcar at all times, even though operating blind or at night.

The operator's cabin should be lo-



Measuring skip loading tramcar at the No. 20 loading terminal

cated either above or to one side of the landing point of the tramcar so as to be safe from a possible runaway tramcar or broken wire rope.

All wheels and sheaves should be equipped with antifriction bearings. All castings and wheels, excepting sheaves, should be steel. Safety nets or guard screens are required where trams are located over improvements or traveled areas. Dumping areas should be located as far as practical from improvements.

In calculating dumping capacity, sufficient allowance must be made for sag in track cables while under load. In long spans the sag is considerable.

Storage Space Considerations

In mountainous country a profile along the span does not generally reveal all the storage space available. Refuse will often run down mountains into neighboring hollows if the angle of repose is exceeded by the dumped material before the bottom of the loaded tramcar is reached. Contours and cross sections are required to show the true picture. The angle of repose for tramway dumped material is usually accepted as at 35-degree slope. In a single car tramway it will be found good design to have the traction rope loop in a straight vertical plane coinciding with the centerline of the tramway. Wherever possible the driving machinery should be located 20 feet or more back of the tramcar loading point.

Provision should be made for easy disposal of spillage accumulation at the loading points.



160 cu. ft. capacity tramcar entering loading terminal at the No. 22 plant

Systematic lubrication and check-overs are required to obtain the best service from the plants. It was found that oral instructions were not specific enough for best results, and the contractors were requested to issue detailed printed instructions for operation and maintenance.

The standard instructions have fully justified themselves and have done away with confusion which is generally found where a number of men, having different ideas, must alternately operate a device.

We also derive benefits from the installation of sighting bars which permit readily the checking of the track cable tension from the loading terminal by seeing whether the cable sag is above or below the line of sight.

As our personnel has become more familiar with aerial trams, their maintenance is now little more than routine. The aerial way of disposing refuse has simplified conditions about our tipples, by eliminating the formerly heavy truck traffic. The highways have become safer and are cleaner. Refuse disposal is now practically free from interruption due to sleet, ice, snow, high water, or weather in general. Delays due to blocked railroad crossings have been eliminated.



The 100-ft. high pivoted breakover tower at the No. 22 aerial tramway

The aerial trams have become necessary units of our preparation plants and have justified themselves at the Island Creek Coal Company.

Equipment Suppliers for Aerial Trams at the Nos. 7, 14 and 20 Mines

Contractor for design, manufacture and installation: Interstate Equipment Corporation.

Cables: Interstate type track cables.

Tramcars and other machinery: Interstate Equipment Corporation.

Tram drive motors and all control equipment: General Electric Company.

Gear motors: Westinghouse Electric & Mfg. Company.

Bearings in tramcar wheels and haul rope idler sheaves: Timken Roller Bearing Company.

Stair treads, walkways and platforms: Blaw-Knox Company.

Steel structures: Fabricated by Blaw-Knox Company.

Equipment Suppliers for Aerial Trams at Nos. 1 and 22 Mines

Contractor for design, manufacture and installation: American Steel and Wire Company.

Cables, ropes, mechanical equipment and structural steel: Tramway Division of American Steel & Wire Company.

Electrical Equipment, motors and controls: Westinghouse Electric & Mfg. Company.

Reciprocating plate feeders: Jeffrey Manufacturing Company.

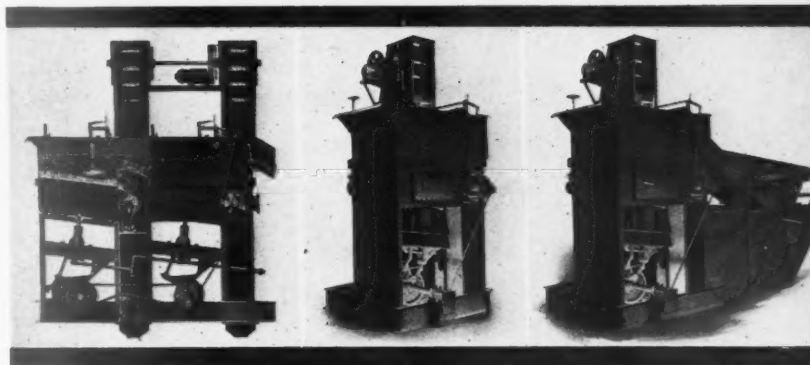
Bearings for carriage wheels and sheaves: Timken Roller Bearing Company.

Bearings for sheaves: Rollway Bearing Company.

Demand for better prepared coal has brought out new machinery and new methods designed to remove impurities and to improve the appearance of the coal.

Jeffrey builds the most effective high capacity mechanical coal cleaning units on the market today. Air-operated (Baum type) jigs have capacities up to 400 T. P. H.; Diaphragm jigs up to 200 T. P. H.; and for the smaller tonnages there is the Jeffrey Unit Washer.

Many features contribute to the effectiveness of Jeffrey Jigs. They make possible a new high in capacity at minimum cost per ton of coal washed. We would like to tell you more about these units and how they can help you meet the demands of an increasingly exacting market.



PATENTED

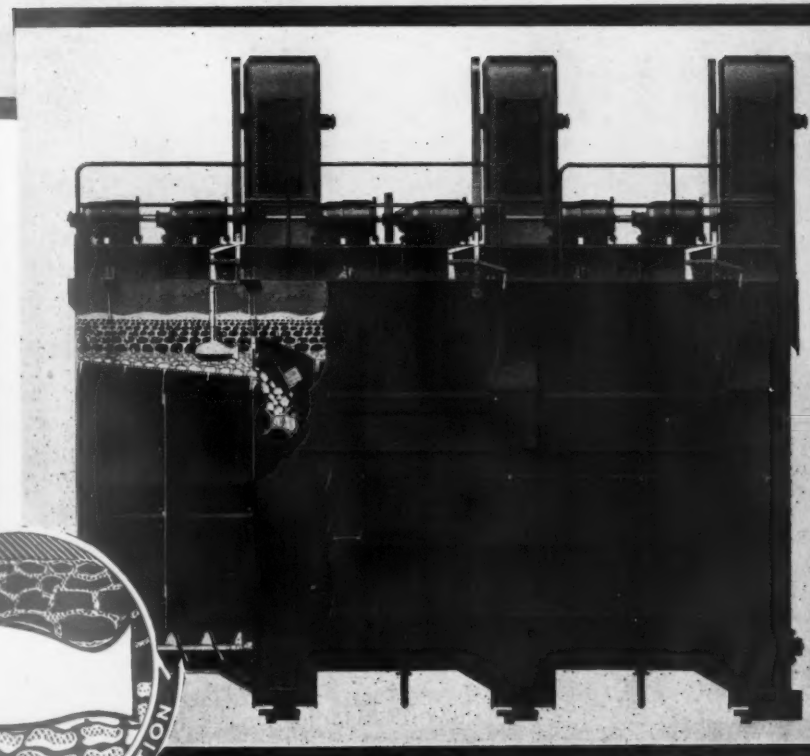
Jeffrey

Coal Preparation . . .

The illustration at the top of page shows a modern big tonnage Preparation plant designed, erected and equipped by Jeffrey. Also illustrated are the various types of jigs which Jeffrey offers to give you maximum coal realization per dollar of investment. The one and two-compartment Diaphragm jig and the Unit Washer are shown above; the three-compartment air-operated jig is shown at the right.

Catalog No. 691 fully describes and pictures these Jeffrey jigs. Send for your copy.

COAL PREPARATION DIVISION



Side view of three-compartment jig with cut away sections to show Float Cont and Refuse Ejector. Note rigid construction of jig body.

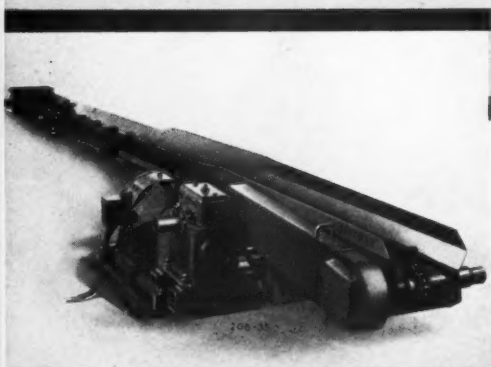
THE NEW JEFFREY CONVEYOR LOADER

61-CL

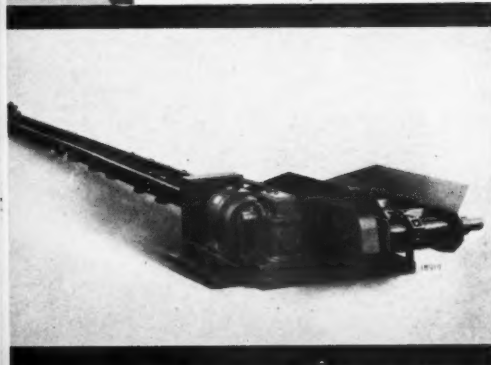
Announcing

**Decreases Loading Costs
In Low Coal
Loads Into Conveyors**

The Jeffrey 61-CL Conveyor Loader will give you less labor cost per ton of coal. It is fast, flexible, and safe. In the illustration (right) note its sturdy construction.



A complete set of mine conveyors for entry, room and face work. The 61-AM room conveyor is illustrated.



Jeffrey 61-HG face conveyor. Also elevating and

Especially designed for conveyor loading and particularly adapted for thin seams (coal line — $25\frac{1}{2}$ "), the Jeffrey 61-CL Conveyor Loader has a capacity of from 1 to $1\frac{1}{2}$ tons per minute . . . is mounted and accurately balanced on two rubber-tired dual wheels.

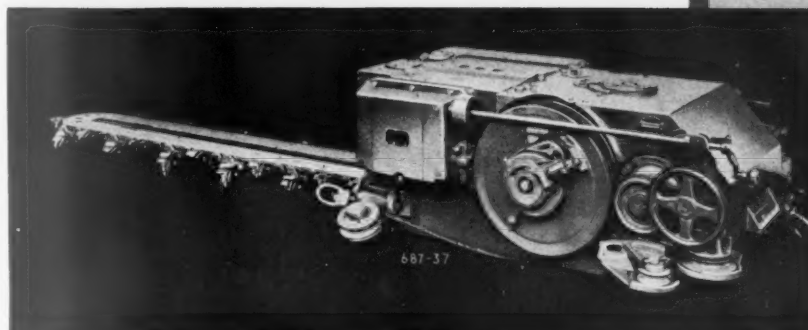
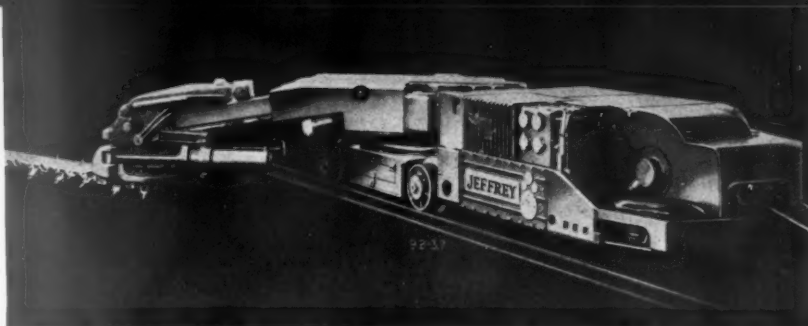
Entire operation is centrally located with electric controls for tramming and operating the gathering and discharge conveyors. An 18 H.P. motor serves as the main drive, while two 2 H.P. motors handle tramming and maneuvering.

Discharge boom can be swung 45° each side of center line, permitting it to load into conveyor from any angle . . . low discharge point reduces breakage to a minimum. Overall height with removable side boards is only $28\frac{1}{2}$ " . . . minimum length is $14\frac{1}{2}$ ft. . . weight is 5800 lbs.

See this New Conveyor Loader on display in the Jeffrey Booths.

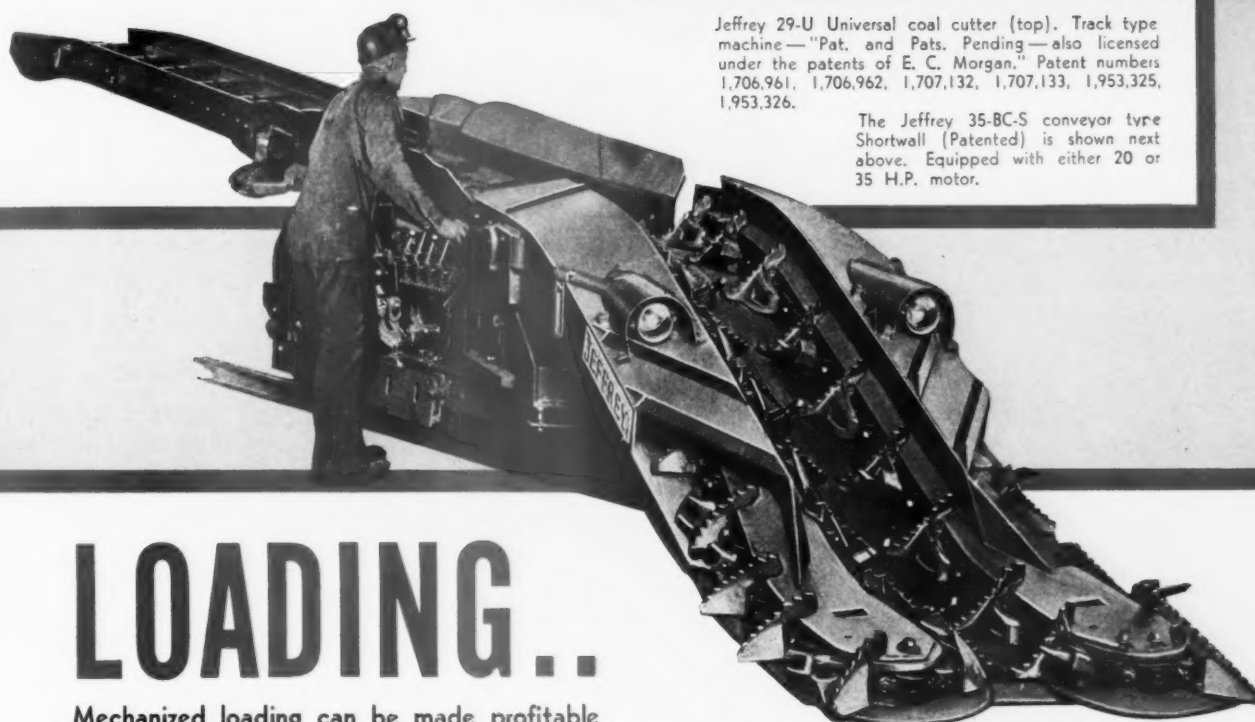
CUTTING

Cutting sets the pace in operations below ground. Jeffrey cutters are pace-setters, all of them. The 29-U Universal track-mounted cutter (top-right) has quick, positive hydraulic controls and is used for kerfing and shearing anywhere within reach of cutter bar. Cuts 11" below rail, 87" above, and anywhere between. Also Longwall and Shortwall cutters . . . and Shortwalls for conveyor mining.



Jeffrey 29-U Universal coal cutter (top). Track type machine—"Pat. and Pats. Pending"—also licensed under the patents of E. C. Morgan." Patent numbers 1,706,961, 1,706,962, 1,707,132, 1,707,133, 1,953,325, 1,953,326.

The Jeffrey 35-BC-S conveyor type Shortwall (Patented) is shown next above. Equipped with either 20 or 35 H.P. motor.



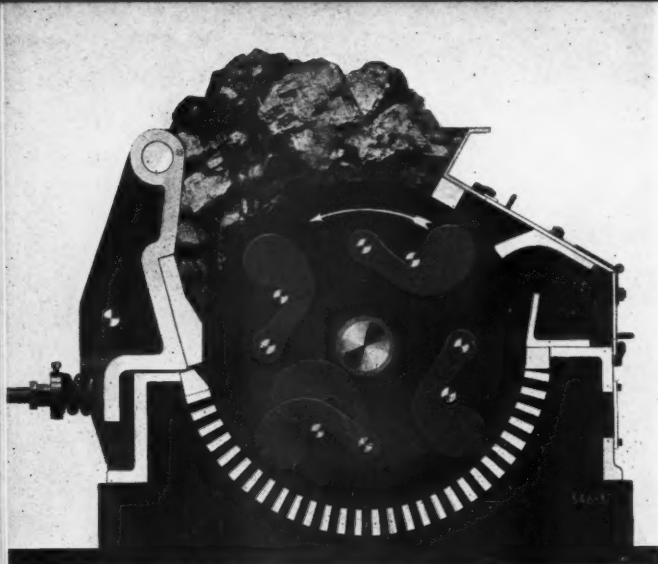
LOADING..

Mechanized loading can be made profitable with Jeffrey loaders on the job. The Jeffrey super-capacity L-400 loader (Patented) is illustrated. A frontal-attack unit with such features as finger-touch hydraulic control and automatic cable reel to speed its movements.

Capacity is there when needed . . . on a room face, the L-400 loaded one 5-ton car in 30 seconds, the second in 32 seconds. A machine of action . . . high production with extraordinary gathering and handling capacity. See this unit at the show.

DRILLING

Three Jeffrey power drills provide speedy drilling, an economy in mechanical mining. 56-A for multiple drilling . . . light weight A-7 hand held drill for conveyor mining . . . A-6 post-mounted drill for the harder, thicker coals.



SIZING

Once coal is out of the ground, you are confronted with the other half of your production job . . . selective processing without waste. Jeffrey crushers will convert slow-moving lump coal to stoker size in one reduction with a minimum of fines . . . will help you turn potential loss into actual profit. They will enable you to send to market the sizes that are wanted, when they are wanted, and with remarkably little undersize loss.

The Jeffrey 'Flextooth' crusher (patented) will reduce lump, egg, nut and run-of-mine coal to a 100% — 1" round product, or smaller sizes of Domestic stoker coal.



SCREENING

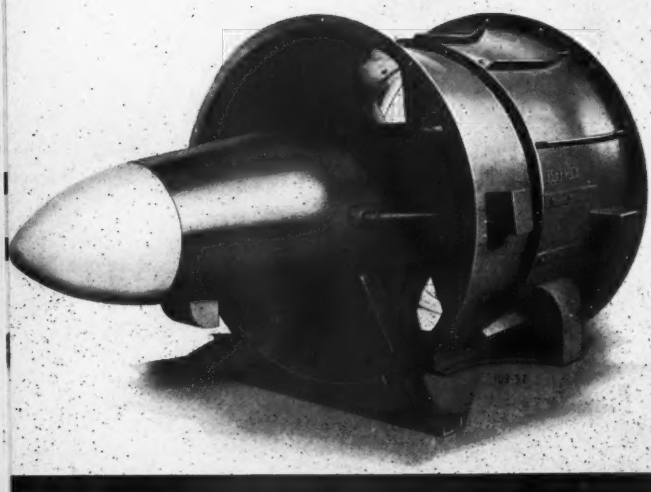
Jeffrey-Traylor electric vibrating Screens (Patented) are constantly adjustable . . . have no moving mechanical parts . . . require no lubrication . . . may be totally enclosed for handling dusty coal. These screens are peculiarly adapted to the sizing of coal. The sharp, high frequency vibrations minimize binding and guarantee high "through-screen" capacity on fine coal. Also electric vibrating feeders are setting new standards of dependance and precision in delivering coal to crushers, conveyors and cleaning systems.

VENTILATION

A lifetime study of the peculiar problems of mine ventilation has given Jeffrey ventilating experts the ability to design a fan of the right type to provide an abundant supply of fresh air at the lowest possible cost.

The Jeffrey Aerodyne (Patented) will maintain static efficiencies exceeding 80% when working over a comparatively wide range of duties. It lends itself to installation where space is limited . . . provides high pressures . . . saves power . . . and is reversible by merely changing direction of motor rotation. The Aerodyne is illustrated.

Also centrifugal type fans; and for auxiliary ventilation there are centrifugal or propeller blowers.



THE JEFFREY MANUFACTURING COMPANY
958-99 NORTH FOURTH STREET
Columbus, Ohio



SEE the first Jeffrey coal cutter introduced to the Industry in 1877.

SEE the movies of Jeffrey equipment in actual operation in the Little Theatre off Jeffrey Square.

All Set For

COAL'S CONVENTION

● *Advance Interest Presages Another Record Breaking Attendance at the 16th Annual Coal Show of the American Mining Congress*

THOUSANDS of coal operators from all parts of the country are again packing their duds in preparation for their annual trek to Cincinnati's Music Hall for the 16th Annual Coal Convention and Exposition of the American Mining Congress convening April 24-28. Crucial conditions facing the industry at present add emphasis to the importance of attending Coal's Annual World's Fair—the largest and most important gathering of coal men throughout the year—where these problems will be thoroughly analyzed by the industry's authorities, and solutions suggested. All important angles bearing on coal's comeback will be thrashed out—in the Convention sessions, in talks with manufacturers at the exposition, and during "off hours"—and from these will emerge substantial progress toward a constructive program to carry the industry back to its former healthy position.

Agair, keynoting the entire gathering will be the theme of PROGRESS—both in the program of practical operating problems and economic discussions, and in the huge exposition of mine equipment and supplies. Is it any wonder, therefore, that key production men and executives of hundreds of coal companies will be in the vanguard of delegates when Music Hall's doors open to usher in the meeting at 9 a. m. on April 24—

augmented by a full force of experts from mine equipment and supply manufacturers to display their latest wares and talk over tough operating problems with all who are interested.

Program

Under the inspiring leadership of W. J. Jenkins, president, Consolidated Coal Company, National Chairman of the Program Committee, a group of 101 prominent operating men (shown on pages 38 and 39) from 13 coal districts throughout the United States, has worked diligently for more than three months planning the presentation of a series of papers by outstanding authorities on subjects of particular timeliness that will merit widespread attention. Members of the Board of Governors of the Coal Division of the American Mining Congress are ex-officio members of the Program Committee and have been of great assistance in formulating these plans.

The committee has been particularly interested in developing methods to promote a maximum of floor discussion following each address, for which ample time has been allowed on the program.

The complete program, showing subjects of papers, authors and session chairmen, may be found on page 41.

Progress in modernizing under-

ground coal mine operations during recent years has centered in development of more efficient mechanical loading and conveyor methods. One entire session will be devoted to outstanding problems concerning mobile loaders, featured by a symposium on gathering methods covering shuttle haulage with rubber-tired cars, dual haulage with service cars, and use of specially large mine cars. Discussion on conveyor mining will also be featured by a symposium, which will cover the pros and cons of various types of conveyor loading, including mechanical, hand and self-loading conveyors. Advantages of thorough engineering studies and cost analyses of conveyor operations will likewise be stressed.

Adoption of machinery methods on a wide scale underground would not have been possible without parallel improvements in surface preparation. An entire session will be devoted to this subject, during which a paper will be presented on general problems of coal preparation, with another on methods of dewatering to prevent freezing, and the third outlining factors affecting results when air cleaning fine coal.

Vital aspects of organizing and effectuating a really workable safety program will be outlined in a separate session, the specific subjects to be cov-

(Continued on page 40)



R. L. IRELAND, JR.

President, The Hanna Coal Co.

As Chairman of the Coal Division of the American Mining Congress, Mr. Ireland is performing valuable service to the coal industry by directing the Division's activities along sound and constructive lines. His rich background of mining experience coupled with capable and aggressive executive ability assure effective progress in the Division's work.

R. L. COX

Vice President, The Jeffrey Manufacturing Co.

Mr. Cox is Chairman of the Manufacturers' Division of the American Mining Congress, in which capacity he has given fine leadership in development of another outstanding exposition of mine equipment and supplies. He is in charge of mining sales for one of the oldest and largest equipment manufacturers in the business.



W. J. JENKINS

President, The Consolidated Coal Co.

76

Mr. Jenkins is National Chairman of the Program Committee, and has spared no effort in planning a program that will draw widespread interest and attention from executives and operators throughout the industry. His intimate knowledge of coal mining, gained through a lifetime spent in responsible positions in the industry, has been most valuable in choosing subjects of particular importance to present day mining.



P. C. THOMAS

Vice President, The Koppers Coal Co.

76

As General Chairman of the Committee on Arrangements, Mr. Thomas has contributed generously of his time and effort in seeing that plans will assure all delegates a most pleasant visit in Cincinnati.

Program Committee

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Black Diamond Coal Mining Co.
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Bureau of Mines Safety Station
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H. L. GOOD
Westmoreland Coal Co.
A. W. HESSE
The Buckeye Coal Co.
T. R. JOHNS
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H. C. Frick Coke Co.
T. F. MCCARTHY
The Clearfield Bituminous Coal Corp.
C. C. MCGREGOR
Carnegie Coal Corp.
R. G. PFAHLER
The Berwind-White Coal Mining Co.
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F. R. VINTON
Rochester & Pittsburgh Coal Co.

Ohio



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H. E. NOLD
Ohio State University
W. L. ROBINSON
Youghiogheny & Ohio Coal Co.
A. J. RUFFINI
Wheeling Township Coal Mining Co.
F. G. SMITH
Sunday Creek Coal Co.

Southwestern States



C. Y. THOMAS, *Chairman*
Pittsburg & Midway Coal Mining Co.

C. T. CARNEY
Scandia Coal Co.
WM. R. CHEDSEY
Missouri School of Mines
IRA CLEMENS
The Commercial Fuel Co.
GEO. COLVILLE, JR.
Jewell Mining Co.
HEBER DENMAN
Paris Purity Coal Co.
MERL C. KELCE
Sinclair Coal Co.
W. C. SHANK
Crowe Coal Co.

Colorado-New Mexico



T. E. JENKINS, *Chairman*
National Fuel Co.

C. R. GARRETT
American Smelting & Refining Co.
H. C. MARCHANT
Colorado-Utah Coal Co.
GEORGE H. RUPP
The Colorado Fuel & Iron Corp.

Wyoming-Montana



D. H. PAPE, *Chairman*
Sheridan-Wyoming Coal Co.

ALBERT GATELY
Republic Coal Co.
LOUIS LASALLE
Colony Coal Co.
GEORGE B. PRYDE
Union Pacific Coal Co.

Utah-Washington



WALTER F. CLARKE, *Chairman*
Independent Coal & Coke Co.

E. P. LUCAS
Bellingham Coal Mines
W. N. WETZEL
United States Fuel Co.

Entertainment

L. F. CROUSE
Monroe Coal
Mining Co.

W. D. TURNBULL
Westinghouse Elec.
& Mfg. Co.

Floor



C. W. GIBBS	JAMES HYSLOP
Harwick Coal &	Walter Bledsoe &
Coke Co.	Co.

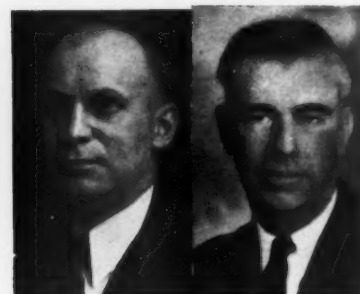
C. F. CONNELLY
PERCY G. COWIN
M. W. HORGAN
HARRY LAVIERS
CARL LEE
H. E. NOLD
W. C. SHANK

Miners' Exhibit



W. W. RODGERS W. C. RICHARDS
Westinghouse Elec. A. Leschen & Sons
& Mfg. Co. Rope Co.

J. W. BROADWAY
JAS. L. DAVIDSON
A. W. FISHER
H. S. HOMAN
VAN B. HOOPER
THEODORE MARVIN
J. V. SULLIVAN
K. F. TRESCHOW
FRED S. WILKEY
M. W. WILSHIRE
J. C. WILSON



W. W. DARTNELL
Claremont, N. H.

K. R. BIXBY
Midland Elec.
Coal Co.

C. C. BALLARD
C. S. BLAIR
H. G. CONRAD
JOS. L. OSLER
JOHN T. PARKER
GEORGE B. PRYDE
JEROME C. WHITE

Arrangements



C. J. SANDOE
Perry Coal Co.

THOS. McNALLY
McNally-Pitts-
burg Corp.

ered including "Safety Rules, Standards and Inspection," "Securing and Maintaining Employee Cooperation in Safety Work," and "Standardizing State Examinations for Mine Officials."

Unusual interest will attach to discussion of important national eco-

conomic problems facing the coal industry today, an entire session being turned over to this general subject. Merits and demerits of federal regulation of the coal industry will be thoroughly analyzed, and benefits of mechanization to the industry outlined.

With P. C. Thomas, vice president, Koppers Coal Company, as General Chairman of the Committee on Arrangements, no efforts have been spared by all committee members shown above to make the coming convention

PROGRAM

MONDAY, APRIL 24

MORNING SESSION—10:00 A. M.

Opening of Convention:

JULIAN D. CONOVER, Secretary, American Mining Congress

INTRODUCING:

HOWARD I. YOUNG, President, American Mining Congress

WILLIAM J. JENKINS, President, Consolidated Coal Co.

National Chairman, Program Committee

R. L. IRELAND, JR., President, Hanna Coal Co.

Chairman, Coal Division

ROY L. COX, Vice President, The Jeffrey Manufacturing Co.

Chairman, Manufacturers Division

Session Chairman: **WESLEY S. HARRIS**, President, Bicknell Coal Co.

ROOF PROBLEMS AND TIMBER RECOVERY

GEORGE A. BROWN, Mine Supt., Union Pacific Coal Co.

MACHINE MAINTENANCE—PRACTICES, PROCEDURE AND RECORDS

ERNEST PRUDENT, E. E., Bell & Zoller Coal & Mng. Co.

STREAM POLLUTION LEGISLATION

J. W. WOOMER, Chf. Mng. Engr., Hanna Coal Co., of Ohio

AFTERNOON SESSION—2:00 P. M.

Surface Preparation

Chairman:

COAL PREPARATION

P. D. EVERLY, Supt. of Prep., Island Creek Coal Co.

SOME FACTORS AFFECTING RESULTS WHEN AIR CLEANING FINE COAL

D. H. DAVIS, Chief Chemist, and

V. D. HANSON, Asst. Preparation Engr.,

Pittsburgh Coal Co.

DEWATERING TO PREVENT FREEZING

OTIS BLEDSOE, Chief Engineer, Pyramid Coal Corp.

TUESDAY, APRIL 25

MORNING SESSION—10:00 A. M.

Chairman: **GEORGE T. STEVENS**, Chf. Engr., Clinchfield Coal Corp.

GUNITING TO PREVENT SLATE FALLS

C. W. JEFFERS, Gen. Supt., United States Coal Co.

A WORKER'S IDEA OF WHAT A MINE FOREMAN SHOULD BE

JAMES DUFFY, Motorman, Buckskin Coal Company

NEW DEVELOPMENTS IN COAL STRIPPING

C. M. GUTHRIE, Supt., Seneca Coal Co.

AFTERNOON SESSION—2:00 P. M.

Conveyor Mining

Chairman: **THOS. G. FEAR**, Gen. Mgr., Elk Horn Coal Corp.

ENGINEERING STUDIES AND CONVEYOR COST ANALYSES

T. F. MCCARTHY, Gen. Supt., Clearfield Bituminous Coal Corp., and

C. P. BRINTON, Mng. Engr., Barnes & Tucker Co.

SYMPOSIUM ON CONVEYOR LOADING

(a) **Mechanical Loading—**

HAROLD MCDERMOTT, Vice Pres.,

New Castle Coal Co.

Stith Coal Co.

(b) **Hand Loading—**

A. F. WHITT, G. S., West Virginia Coal & Coke Corp.

(c) **Self-Loading Conveyors—**

T. F. CHRISTIAN, Gen. Supt., West Kentucky Coal Co.

WEDNESDAY, APRIL 26

MORNING SESSION—10:00 A. M.

Chairman: **A. J. RUFFINI**, Supt., Wheeling Township Coal Mining Co.

SELECTIVE MINING AT RALEIGH-WYOMING MNG. CO.
Author to be announced.

OXYACETYLENE AND ELECTRIC WELDING FOR EQUIPMENT REPAIR

DON SMITH, Asst. Supt. of Maintenance, The Hudson Coal Co.

ORGANIZING THE SUPERVISION OF MECHANIZED MINING

FRANK E. CHRISTOPHER, Pres., Christopher Mining Co.

AFTERNOON SESSION—2:00 P. M.

Mechanical Loading

Chairman: **NEWELL G. ALFORD**, Consulting Engineer, Eavenson, Alford & Auchmuty

PRODUCTION OF DOMESTIC SIZES WITH MECHANICAL LOADING

GEORGE M. SMITH, Mine Supt., Peabody Coal Co.

SYMPOSIUM ON GATHERING HAULAGE

(a) **Two Years' Experience with Rubber Tired Gathering Equipment—**

W. A. VINSON, Gen. Supt., Hart Coal Co.

(b) **Dual Haulage with Service Cars—**

JOHN H. EVANS, Mine Supt., Wasson Coal Co.

(c) **One Thousand Shifts with a 10-Ton Mine Car—**

S. M. CASSIDY, Mgr., Weirton Coal Co.

THURSDAY, APRIL 27

MORNING SESSION—10:00 A. M.

National Economic Problems

Chairman: **W. J. JENKINS**, Pres., Consolidated Coal Co.

BENEFITS OF MECHANIZATION TO THE COAL INDUSTRY

L. E. YOUNG, Vice Pres., Pittsburgh Coal Company

MERITS AND DEMERITS OF FEDERAL REGULATION OF THE COAL INDUSTRY

GEORGE B. HARRINGTON, Pres., Chicago, Wilmington & Franklin Coal Co.

AFTERNOON SESSION—2:00 P. M.

Safety and Supervision

Chairman: **L. C. CAMPBELL**, Asst. to Vice Pres., Koppers Coal Co.

SAFETY RULES, STANDARDS AND INSPECTION

J. J. SELLERS, Vice Pres., Virginia Iron, Coal and Coke Co.

SECURING AND MAINTAINING EMPLOYEE COOPERATION IN SAFETY WORK

C. J. FLIPPEN, Safety Dir., Fuel Dept. N. & W. Railway

STANDARDIZING STATE EXAMINATIONS FOR MINE OFFICIALS

JAMES C. GRAY, Mine Supt., Tennessee Coal, Iron and Railroad Co.

FRIDAY MORNING, APRIL 28—Exhibitors' Day

No convention sessions—to permit uninterrupted inspection of exhibits.

the best ever offered to the industry. The Attendance Committee has done a splendid job notifying key men in the industry throughout the country of the importance and value of the Convention and Exposition, with the Publicity Committee working in close conjunction with them. The Welcoming Committee will do its very best to maintain an atmosphere of cordial hospitality at the meeting throughout the week, and the Floor Committee will see that proceedings at all the sessions are run off smoothly according to schedule.

Miners' Exhibit

Don't miss the Miners' Exhibit at Music Hall—a new feature of this year's meeting consisting of a display of "operating kinks" or devices developed by employes of coal companies, designed for local use and found practicable in actual service. It is hoped that by giving prominent recognition to this type of ingenuity, further inventive effort will be stimulated, reacting to the general betterment of mining. The Miners' Exhibit Committee has performed yeoman service in planning this event and enlisting interest in submission of entries.

Entertainment

That "yen" to relax after the day's activities will be completely satisfied through the efforts of the Entertainment Committee in providing four solid evenings of riproaring fun.

Headlining all four nights of the program will be Dorothy Byton's top line of dancers—an exceptionally beautiful and talented group of girls whose novel ensemble and specialty routines have won sensational successes wherever they have appeared. Also appearing throughout the four nights will be the Singing Marines

and Blanche Bradley, a group whose close harmony and dashing appearance have rapidly brought them to the top in vocal entertainment. Exotic dancing by glamorous Francita, whose beautiful looks and novel numbers have won national recognition on the stage and in headline movies, will likewise add to the enjoyment of all evening programs.

The festival of fun will open with a bang on Monday evening in the Pavillon Caprice in the Netherland Plaza with gay diversion under the "big top" for a celebration of Circus Night. Clowns and their side-splitting antics, hula dancers, cowgirls, a gaily costumed band, rousing numbers by the Singing Marines, acrobatic dancing by the Bytonettes and novel numbers by Francita—all of these plus big time novelty acts will perform to the crack of Joe Wallace's whip as ringmaster in a genuine circus setting. Peanuts, popcorn, chewing gum and balloons will be the order of the day, and there will doubtless be pink lemonade for those who prefer it.

Tuesday night will feature a Miners' Picnic—Stags Only, to be held in the newly redecorated ball room on the roof of the Gibson Hotel. This will be the real "mixer" you've been waiting for, affording a fine opportunity to spin yarns with your old mining pals—with a background of songs and music by Herman Pirchner's Alpine Village troupe, including Otto Thurn's brass band, the only authentic Alpine orchestra in America. You'll have plenty of chances to test "Old Lady Luck," with liberal prizes going to those finishing with the largest "winnings." Beer will be "on the house," and there'll also be an old-time "free lunch counter." Inimitable card tricks by jovial Matt Schulien, specialty and ensemble dances, including the spectacular Firebird Dance, stirring songs, and internationally

known novelty acts will complete the program.

On Wednesday night there will be another floor show of celebrated radio and stage performers, featuring the nationally known WLW Boone County Jamboree in a frolic of rural comedy, singing, music and square dances made famous by them over the radio. Novel dance numbers by the Bytonettes and Francita, and close harmony by the Singing Marines, "Those Giants of Song," will round out an evening cram full of sure-fire action and fun, with Joe Wallace again at the helm.

Climaxing the week's festivities on Thursday night will be the annual speechless banquet, with delicious cuisine, the "tops" in entertainment and dancing to fine music. Headlining the entertainment will be Jane Pickens, popular songstress of the radio and stage, whose lovely voice, beautiful appearance and charming personality combine to sell a popular song in a really big way. Rounding out the entertainment will be specialty and group dancing by the Bytonettes and Francita, and the Singing Marines with Blanche Bradley in their most popular numbers.

Special entertainment for the many visiting ladies will comprise a get-together luncheon on Monday, followed by a trip through the Procter and Gamble Company plant in the afternoon; regularly scheduled sightseeing trips during the day on Tuesday, with a dinner party in the evening featuring a preview of the entertainment to be given later at the men's stag party, and a bridge luncheon with private style show presenting latest New York fashions by Henry Harris, Inc., on Wednesday. The ladies are also cordially invited to attend the evening entertainment functions on Monday, Wednesday and Thursday.



Otto Thurn's Alpine Orchestra will feature entertainment at the Miners' Picnic



Dorothy Byton's charming dancers will headline all four nights of entertainment

all Set For

COAL'S EXPOSITION

a Preview

● *New Cost-Cutting Equipment and Supplies to Be Seen at the American Mining Congress Coal Exposition*

THE coal industry has pushed ahead another year in its drive to retain its rightful place as the leading fuel source of our nation. This year has witnessed steady development along the line of mechanization, and the attention of every producing field of the country is centered on the 1939 Coal Show—Coal's World Fair!

It's not stretching things one bit to say that the Cincinnati exposition this year will be bigger and better than ever. Leading manufacturing companies have spent months preparing displays for your attention. They plan to bring you all that's new for coal mining, plus many old standbys touched up here and there by the old master of hard knocks—experience.

A veritable parade of coal's "tools" awaits you—a mile long procession that is completely studded with bright spots. You'll find three large exposition halls jammed full of interest-compelling exhibits. The place will literally be packed with ideas that are worth taking back home with you.

The secret of a completely successful visit to the Coal Show lies in realizing the maximum benefits to yourself.

Visit every single exhibit! Be curious! Ask the manufacturer to tell you his story—he will have something worthy of your attention or he wouldn't be there. You'll find that the exhibitor's representative can be most helpful in solving your knotty problems.

The Manufacturers Division of the American Mining Congress, under the chairmanship of Roy L. Cox, vice president, The Jeffrey Manufacturing Company, is cooperating closely in effectuating plans for the Exposition. Through the courtesy of the General Electric Company, L. W. Shugg is again serving as Director of Exhibits.

The complete story of all that awaits you at the Exposition is beyond the confines of this brief review. Needless to say the exhibits will include all types of equipment and supplies that find a place in coal mine operation. The following notes, outlining the exhibits of individual manufacturers, describe some of the outstanding features of the varied and interesting displays which will make up the 1939 Coal Show. Literature describing the items listed will be gladly furnished upon request to the various companies or to the MINING CONGRESS JOURNAL.

Vice Chairmen of the Manufacturers Division



FRANK E. MUELLER
Roberts & Schaefer Co.



A. S. KNOIZEN
Joy Mfg. Co.



E. J. BURNELL
Link-Belt Co.

DESCRIPTION OF EXHIBITS

• ADVERTISING DISPLAYS, INC.

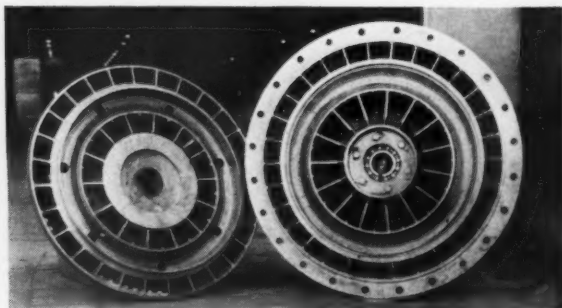
Adaptation of World's Fair motif of design, incorporating color, depth and animation—the outstanding feature used in company's "Tru-to-Life" safety dramalogue. Part of display will feature several processes in manufacture of the dramalogue, demonstrated by workers from the studio staff. *In charge*—W. Ernest DeCoursey and W. P. Cain.

• LOUIS ALLIS COMPANY, THE

Complete line of electric motors used in the coal mining industry, featuring new line of both alternating and direct current explosion-proof, Bureau of Mines permissible type motors for explosive atmospheres; splash-proof motors for wet atmospheres, and totally enclosed dust-proof motors. *In charge*—Van B. Hooper.

• AMERICAN BLOWER CORPORATION

Hydraulic couplings, the fluid transmission which cushions machinery from shock and vibration, used in connec-



tion with mine hoists, conveyors, shaker screens, and coal hauling equipment. *In charge*—John E. Rosebrough.

• AMERICAN BRATTICE CLOTH CORPORATION

Mine Vents Patented Flexible Tubing in two type suspension, coupled to a 12-in. blower fan; company's patented demountable couplings and other accessories used in auxiliary ventilation. *In charge*—H. E. Rhein and Blaine Mikesell.

• AMERICAN CAR AND FOUNDRY COMPANY

Modern mine cars and a number of mine car wheels of different design.

• AMERICAN CYANAMID AND CHEMICAL CORPORATION

Will feature company's explosives department trade name describing product offered to the coal mining industry. *In charge*—G. C. Holton.

• ANACONDA WIRE AND CABLE COMPANY

Photographic display showing interesting and novel applications of power cables, trolley wire, portable cords and other wiring material; new "citrotex" (a glass installation); and a bore hole suspension display as it actually appears in an installation. *In charge*—M. J. McCarthy.

• ATLAS POWDER COMPANY

Atlas Manasite Detonators, Atlas Blakstix and Atlas Coalite, Gel-Coalite and Atcol Permissible Explosives displayed against modernistic lighted background. *In charge*—John Romig.

• BARBER-GREENE COMPANY

Sections of company's standardized sectional construction conveyors, with photographs showing coal being loaded, stocked and reclaimed. Also special mine conveyor.

• BEMIS BRO. BAG COMPANY

Complete set-up of Flexipipe ventilating ducts for auxiliary ventilation in coal mines, featuring company's rope seam suspension and new sliding clamp. *In charge*—D. W. Marshall.

• BETHLEHEM STEEL COMPANY

No. 393 turnout, with 40-lb. rail, heel block, ties of welded construction, switchstand, and reflector target; No. 1217 switchstand; No. 289 manganese frog; steel ties; and switchpoint with spring toggle. Mine car with body sheets of Mayari R high strength steel. Motorized mine car chassis showing action of hydraulic brakes. Mine car wheel and radial section; forged links and pins. Wire rope, illusion strander, rope samples and display of bethanized wire rope. *In charge*—R. W. Saunders.

• BITUMINOUS COAL RESEARCH, INC.

Demonstration of the measurement of dustiness of 50-lb. samples of coal, both untreated and treated with petroleum products. Also photographs showing organization's stoker laboratory. *In charge*—E. R. Kaiser.

• BOWDIL COMPANY, THE

Section of cutter bar and chain and the choke arc switch for pole and reel motors, various types of bits, picks, drills, etc. *In charge*—A. J. Leach.

• BRODERICK AND BASCOM ROPE COMPANY

Various types of wire rope used by the mining industry and company's patented Murray Plaited Safety Slings. *In charge*—F. W. Grice.

• L. M. BROWN, INC.

Mine bit sharpening machine in operation having capacity of 600 bits per hour, and larger capacity for redressing operations, with furnace for heating the bits preparatory to sharpening.



L. W. SHUGG, Director of Exhibits
—Courtesy General Electric Co.

• BROWN-FAYRO COMPANY, THE

Model HKL conveyor car spotting hoist—a low seam type; HGD conveyor auxiliary hoist for dragging sections and supplies up to working point; BC tubing blower—a new unit with increased capacity through longer lengths of tubing; Model RD electric car retarder—a new machine with thruster operated brake and motor rewind; Model 2F8 high pressure oil spray showing its working principle and operation; Model TRE chilled cast iron track roller; Model TRF rubber covered track roller; and "Brownie" rerailers. *In charge*—Fred M. Davis.

• BUCYRUS-ERIE COMPANY

Photographic display of mining applications of company's earth moving equipment.

• CARDOX CORPORATION

Equipment used in effective dislodging of coal. *In charge*—Nicholas Christensen.

• CENTRAL ELECTRIC REPAIR COMPANY

Demonstration of utility of company's tramp iron and steel removal magnet in coal mining and preparation. *In charge*—E. R. Manley.

• CHICAGO PNEUMATIC TOOL COMPANY

Mounted electric coal drills and unmounted hand-held portable coal drills in both open and permissible types. Also a new model unmounted coal drill in permissible and open type equipped with a safety clutch, as well as portable electric and pneumatic drills, nut runners, grinders, chipping hammers, riveting hammers, etc.

• CINCINNATI MINE MACHINERY COMPANY, THE

"Cincinnati" cutter chain of both duplex and $\frac{1}{2}$ " x 1" bit types, as well as several cutter bars and allied parts. *In charge*—E. P. Stenger or A. O. Bruestle.

• COAL AGE

Copies of annual pre-convention issue of publication. *In charge*—A. W. Fisher.

• DEISTER CONCENTRATOR CO., THE

Commercial size 4 ft. x 7 ft. Leahy motorized screen; latest type Concenco anti-friction bearing, and operating demonstration of various types of Concenco spray nozzles. *In charge*—R. T. Bliss.

• DEISTER MACHINE COMPANY

Coal cleaning and screening equipment featuring company's latest type Deister Heavy-Duty Plate-O Vibrating Screens and large capacity coal washing tables.

• DEMING COMPANY, THE

Working model of company's deep well turbine pump and cut-open model of the same type; also a working model of the Deming self-priming centrifugal pump, with cut-open model of this same type and large drawings of other special pumps. *In charge*—E. E. Kendall.

• DIFFERENTIAL STEEL CAR COMPANY

Differential AXLESS Mine Locomotive powered with four motors and designed to operate safely at speeds up to 30 miles per hour, exhibited so as to demonstrate various movements of the wheel. Also company's 10-ton AXLESS mine car featuring low heights, large capacities, and roadability, with brakes and automatic couplers. *In charge*—Shelly G. Hughes.

• DOUGLAS-GUARDIAN WAREHOUSE CORPORATION

Electric display showing various commodities warehoused by company.

• DUFF-NORTON MANUFACTURING COMPANY

New Automatic Lowering Line with a stronger base and

changed fulcrum position allowing much easier operation than earlier models; new and improved mine roof jacks for 7-ton and 15-ton loads; and numerous ball bearing screw jacks, ratchet-type jacks and other types of lifting equipment. *In charge*—G. C. Hutchinson, Jr.

• DUSTLIX CORPORATION

Two types of automatic trademarking units being used by representative operators. *In charge*—J. A. Cormack.

• THOMAS A. EDISON, INC.

"Nickel Plate Snow Storm" showing effectively ingredients going into the Edison Nickel-Iron-Alkaline storage battery. Also Nickel-Iron-Alkaline storage battery cells for use in permissible mine locomotives, including cut-away section. Also the Edison Electric Safety Cap Lamp and all accessory equipment, and a miner's hand lamp.

• ELECTRIC CONTROLLER & MFG. CO., THE

New EC&M LINE-ARC Repeating Sectionalizers for protection of direct current power circuits, consisting of a magnetic contactor of LINE-ARC design, and over-



load relay equipped with ratchet lock-out feature and a timing circuit to provide time delay after the over-load relay has tripped and opened the conductor due to over-load, ground or short circuit. *In charge*—F. C. Winters.

• ELECTRIC RAILWAY EQUIPMENT CO., THE

New types of section insulators and switches; quick break switches; trolley line material items, including trolley harp, wheels, section insulators, splices of all types, mine hangers, trolley clamps, and complete line of suspension devices for supporting feeder wire cables. *In charge*—A. L. Johnston and C. A. Cawood.

• ELECTRIC RAILWAY IMPROVEMENT COMPANY, THE

New rail bond, Type A5, utilizing a new method of bonding around the splice bar, permitting use of shorter



bonds than heretofore practiced; and other types of rail bonds, bonding and welding outfits. *In charge*—P. T. Bevers.

● **ELECTRIC STORAGE BATTERY COMPANY, THE**

Cut-away cells of various size Exide and Exide-Iron Clad batteries, including huge replica of Exide automobile starting and lighting batteries within which visitors at booth are invited to check their hats and coats. *In charge—L. M. Gay.*

● **FAIRMONT MACHINERY COMPANY**

Joint exhibit with United Engineers and Constructors, featuring the Chance Flotation Coal Cleaning System, with photographic display of coal preparation plants recently constructed. *In charge—L. Sargeant.*

● **FLOOD CITY BRASS AND ELECTRIC COMPANY**

Company's new car spotting hoist, incorporating new worm gear reducer with non-reversible drive so that drum is unmovable when motor is at standstill; also, company's general line of replacement parts, trolley line material and miscellaneous mining specialties. *In charge—H. B. Hughes.*

● **GENERAL ELECTRIC COMPANY**

Direct current BM explosion-proof motor and control; new GE glass insulated coils, new GE Spirakore transformer, and special "House of Magic" display.

● **GOODMAN MANUFACTURING COMPANY**

Company's Type 724 Gobber designed to meet needs for machines to remove and dispose of bands of impurities in draw slate before coal is shot down and loaded out; Type 360 Track Loading Machine; three types of deluxe shortwalls—the 412 (the low vein machine), the 512 particu-



larly suited to conveyor mining, and the 612 low price 20 h. p. machine; and a group of units of conveyor loading equipment; including various types of drives, automatic duckbill, angle troughs, other types of troughing and miscellaneous conveyor details. Also photographs and literature describing the Mancha Storage Battery Locomotive and products of the St. Louis Power Shovel Company. *In charge—J. D. James.*

● **HENDRICK MANUFACTURING COMPANY**

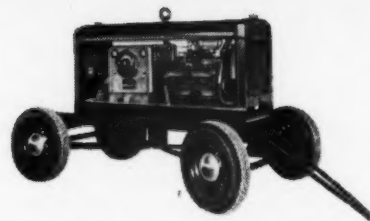
Pictures of Hendrick installations, including screen plates of all kinds, Mitco open steel flooring, and perforated metal grilles, featuring Hendrick flanged lip screens, de-watering screens and perforated elevator buckets, as well as shaking chutes and ball frames. *In charge—W. B. Stoddard.*

● **HERCULES POWDER COMPANY**

Full colored motion pictures showing important steps in the manufacture and testing of explosives. Booth background will represent an open book with illustrations showing salient facts on use of coal in industry and company's service to producers of coal.

● **HOBART BROS. COMPANY, THE**

New line of Multi-Range Arc Welders with wide welding range of each machine divided into 10 ranges with 100 steps operating in each range. Also available in junior models with built-in electric motors in 100 and 150 ampere



ratings, or with self-starting gasoline engines of 200 ampere ratings. *In charge—Frank O. Weber.*

● **INTERSTATE EQUIPMENT CORPORATION**

Photographs of tramway installations, samples of various types of cables used in tramways, samples of cables removed after long service on existing tramways, a car wheel removed from a tramway after years of service, and motion pictures of existing installations. *In charge—G. M. Kilcarr.*

● **I-T-E CIRCUIT BREAKER COMPANY**

Mine map background with colored lights for mine circuits flashing in synchronism with opening and closing of a sectionalizing circuit breaker in the booth; newly designed type KSC sectionalizing unit; improved type KSA automatic reclosing switchboard circuit breaker; and a new piece of protective equipment—a "Load Distributor" comprising an automatic type of voltage regulation for motor generator sets. *In charge—Donald J. Baker.*

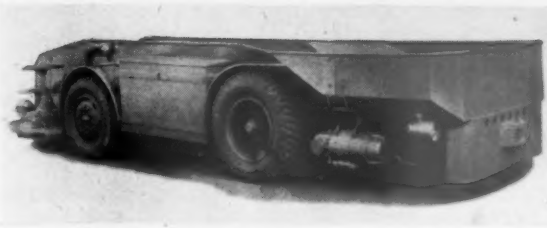
● **JEFFREY MANUFACTURING COMPANY, THE**

Type 29-U Coal Cutter, a universal machine for cutting and shearing any place in the seam; Type L-400 Loading Machine, a high capacity loader capable of handling up to 10 tons per minute; the new Type 61-CL Loader, a small machine for loading into conveyors in thin seams; a new Type 35-20S Shortwall Cutter, for conveyor mining; 5-ft. Aerodyne Mine Fan; Types A-6 and A-7 Drills; Electric Vibrating Conveyanscreen; Electric Vibrating Feeder; Flextooth Crusher for making domestic size stoker coal; and miscellaneous parts and accessories such as controllers, cable reels, resistance, gears, chains, belt idlers, etc. Also on display will be the first Jeffrey Coal Cutter introduced more than 60 years ago, as a contrast to modern-day cutters. The "Jeffrey Little Theatre" will present many reels of moving pictures featuring an interesting presentation of Jeffrey equipment in actual operation.

Outstanding features of company's new 61-CL loader (illustrated), especially designed for conveyor loading, are: low over-all height (28½") with removable side



boards, for operation in low coal; easy maneuverability on two rubber-tired dual wheels; 45° swing of discharge boom from center line; and central location for tramming and operation.



● JOY MANUFACTURING COMPANY

Joy low vein machine and a large 11 BU Loader; also two Shuttle Cars, one 42" high and one 30" high.

● KOPPERS COMPANY

Colorful translites illustrating preparation plant installations by Koppers-Rheolaveur Company, with striking exterior and interior views of the Menzies cone separator. Translites of various applications of treated ties, posts and timber in coal mines, and charts demonstrating the advisability of using pressure-treated products of Wood Preserving Corporation. Also samples of red oak in various stages of preparation.

● KOEHLER MANUFACTURING COMPANY

Complete line of Wheat Mine Lamps. *In charge*—A. C. Dick.

● LA-DEL CONVEYOR & MANUFACTURING CO.

Newly developed side drive reversible motion shaker conveyor in which the entire conveyor trough line including that portion of it passing the shaker drive is at a level only a few inches above the mine bottom. Also a high pressure, high efficiency mine ventilating fan equipped with adjustable pitch fan blade, a small portable propeller type mine blower, and an adjustable pitch blower in which the volume and pressure delivered by the fan can be varied instantly by the turn of a hand wheel. *In charge*—E. M. Platts.

● A. LESCHEN & SONS ROPE CO.

Complete line of wire rope samples, including numerous constructions in which "HERCULES" (Red-Strand) wire rope is used in coal mining, with wide range of round-strand and flattened-strand construction in both standard and pre-formed types. *In charge*—W. C. Richards.

● LINK-BELT CO.

Large photo mural showing Link-Belt equipment used in every phase of coal handling, from mine to coal preparation plant, power plant and into the boiler; a Link-Belt Roto-Louvre dryer in operation; a P.I.V. gear variable speed transmission, and an automatic coal stoker also in operation. *In charge*—A. H. Sampson.

● McLANAHAN & STONE CORP.

New line of improved steel constructed roller bearing Black Diamond crushers, with self-aligning roller bearings used throughout for both shafts, and segments of the roll held by steel wedges. *In charge*—J. C. McLanahan.

● McNALLY-PITTSBURG MFG. CORP., THE

Photographic and diagrammatic exhibition of company's equipment and installations. *In charge*—A. G. Alexander and C. W. Waterman, Jr.

● MACWHYTE COMPANY

Newly developed shovel ropes in a special selected steel 6 x 41 special flexible construction; shaft hoist ropes; mining machine and loader ropes; drilling lines for blast hole drilling; wire rope for carrying-type scrapers, and braided wire rope slings for handling material in machine shops and yards around the mines. *In charge*—V. P. Jenkins or James A. Long.

● MARION STEAM SHOVEL CO., THE

Photographic display of shovels for coal stripping and loading. *In charge*—L. C. Mosley.

● METAL & THERMIT CORP.

Material and equipment for continuous welding of rail by the Thermit process, set up as if for use. *In charge*—H. T. Thompson.

● MINE SAFETY APPLIANCES CO.

New MSA Methane Tester, a pocket size gas indicator; MSA Midget Impinger, a new hand-operated instrument for dust sampling; improved Dustfoe Respirator; Bakelite Explosives Carrier; new One-Hour Oxygen Breathing Apparatus; new Combination Skullgard-Welding Shield; Comfo-Cap Goggle Assembly; Portable Rock Dust Distributor for the conveyor mine; new Edison Hand Lamps; MSA Werkshu, and new MSA Trolley Wire Guard. *In charge*—M. L. Moll.

● MORROW MFG. CO., THE

Full size Morrow Prins Coal Washer with rated capacity of 100 tons per hour, these units also available for capacities ranging from 25 to 300 tons per hour. *In charge*—Ford R. Morrow

● MOTT CORE DRILLING CO.

Diamond core drill plus cores company has drilled, and photographic display. *In charge*—B. H. Mott.

● MYERS-WHALEY CO.

A Whaley Automat Coal Loading Machine in operation, and photographs of machines in use under a wide variety of conditions. *In charge*—Charles C. Whaley.

● NACHOD & U. S. SIGNAL CO.

Operating displays and demonstrations of NUSSCO automatic mine block signals; CESCO electrically operated track switch throwing devices; automatic track derailing switches; hydraulic controls for spring type track switches; trolley contactors; rail contactors, and automatic Safelectric Trolley Poles, with accessories. *In charge*—Everett C. Brown.

● NAIL CITY BRONZE CO.

Bearing testing outfit demonstrating action of company's bearings under severe temperature conditions.

● NATIONAL ELECTRIC COIL CO.

Electrical equipment made by the company. *In charge*—G. C. Reese.

● NATIONAL MALLEABLE & STEEL CASTINGS CO.

NACO cast steel mine car wheels, cast steel mine car hitchings, cast steel mine car friction draft gears, Willison automatic couplers of cast steel, and combination coupler and draft gear with cast steel draft gear housing. *In charge*—L. L. McKee.

● NORDBERG MFG. CO.

A 3 x 10 double deck Symons screen complete with motor, in operation. *In charge*—Delbert Kay.

● NORMA-HOFFMANN BEARINGS CORP.

Working model of a sectional mine locomotive motor; representative samples of company's complete line of ball-roller and thrust bearings, featuring precision cylindrical roller bearings and heavy duty single-roll precision ball bearings; and representative types of company's self-aligning ball and roller bearing pillow blocks and mountings. *In charge*—C. D. Kilham.

● OHIO BRASS CO.

New AW-20 steel arc weld rail bond, fused trolley tap with contact ball and special Bulldog Type B multiple



junction box providing interlocking protection, improved wedge bond track drill, new Bulldog feeder clamp, improved Type A multiple junction box, Type F shoe and harp, hanger-mounted quick brake switch, improved rubber-mounted mine car coupler, and special moving translite panel displaying model mining properties of the past few years.

● **OSMOSE WOOD PRESERVING CO.**

Moving pictures showing simplicity of company's wood preserving treatment; cross sections of Osmosized timbers of various wood species; and photographs of various Osmose treated installations. *In charge—M. B. Morrison.*

● **PENN MACHINE CO.**

Complete line of rail bonds, including entirely new minimum length "SUPER-WELD" joint bond, improved everlast "SUPER-WELD" removable bonds, and "U" bonds; special alloy non-scoring bronze axle liners, journal liners, bushings and bearings designed especially for mine locomotives and mining machines; new form "Stronger Tooth" hardened pinions for mine locomotives, with solid axle gears and other improved replacement parts for cutting machines, mine locomotives, mine pumps and room hoists. *In charge—S. Guy Little.*

● **PENNSYLVANIA ELECTRIC COIL CORP.**

Treatment of field coils with heat resistive, heat reactive varnish by company's Vacuum Pressure Method; new method of winding heavy shunt field coils for coal cutters with wire insulated with enamel and paper; and company's Triple Treated Armature Coils for mine use. *In charge—Kenneth Green.*

● **PHILCO RADIO AND TELEVISION CORP.**

Complete shuttle car battery of new design, with sturdy grids of lower internal resistance; cutaway cells and samples of company's new triple insulation feature of all types of cells, both for shuttle car applications and for use in main line and gathering locomotives, permissible and open types. *In charge—M. G. Jorgese.*

● **PITTSBURGH COAL CARBONIZATION CO.**

Featuring company's Disco, a smokeless fuel manufactured at low temperature in a cylindrical carbonizer, the process utilizing fine coal and sludge, thus converting an almost valueless coal into a profitable and readily marketable fuel. Disco is easily ignited and controlled, and will hold a fire until completely consumed.

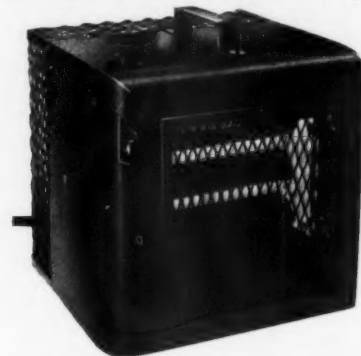
● **PORTABLE LAMP & EQUIPMENT CO.**

Complete line of electric cap lamps and flame safety

lamps; goggles; respirators; safety shoes; safety caps and hats; safety belts; haulage safety devices including car stops, car skids, car derailleurs, transition rails and a new track signalling device; permissible blasting units; powder bags; heated first-aid cabinets, and stretcher boards. *In charge—George C. Nelms and Wm. K. Wilbur.*

● **POST-GLOVER ELECTRIC CO., THE**

Full line of resistors, including Type T2 for locomotives, mining machines and other services; automatic transfer switches and mine duty starters; and a new type of heater



of semi-portable forced convection type, ranging in capacity from 3 to 9 k.w. *In charge—C. E. Nuckels.*

● **PRODUCTIVE EQUIPMENT CORP.**

A 4' x 8' single deck open type Selectro Vibrating Screen of standard construction, adjustable as to both angle of screening surface and amount of eccentricity—used for dedusting dry and damp coal as well as dewatering. *In charge—L. H. Leberman.*

● **FRANK PROX CO., INC.**

Complete line of mining machine cutter chains and cutter bars, together with company's new TOOLSTEEL double action coal cutting bit.

● **PURE OIL CO., THE**

Specimens of mine car wheel bearings featuring lubricants applicable for use to secure maximum performance, featuring company's products for specific purposes, including high temperature armature grease, water resisting greases, heavy duty greases for tramming gears, loader grease and rope dressings. *In charge—E. S. Miller.*

● **ROBERTS & SCHAEFER CO.**

Photographic display of company's three new outstanding coal plant installations at Mather Collieries, Island Creek Coal Company and Allegheny River Mining Company. *In charge—Frank E. Mueller.*

● **ROBINS CONVEYING BELT CO.**

Photographic display of company's products and installations; conveyor idlers, and small working model of one of company's screens. *In charge—A. E. Conover.*

● **JOHN A. ROEBLING'S SONS CO.**

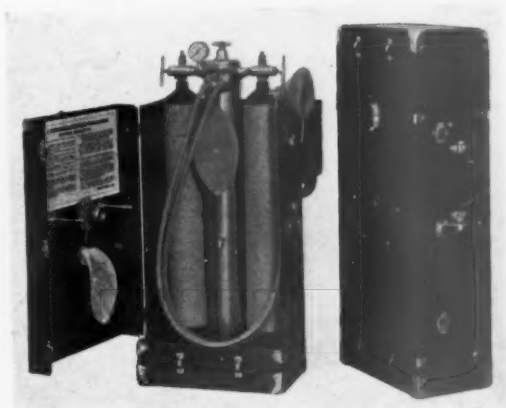
Rhoglas-magnet wire used in winding coils and electric motors using fiber glass insulation; wire rope and electrical wires and cables; and photographic display of various wire rope installations. *In charge—Fred Maple.*

● **ROME CABLE CORP.**

New Rome "60" locomotive cable, and complete line of parallel (Twin) Duplex Concentric and Twisted mining machine cable and other electrical conductors. *In charge—R. A. Gray and C. B. Llewellyn.*

+ + +
SOME NEWLY DEVELOPED ITEMS ON DISPLAY AT
THE EXPOSITION

Track mounted loading machine for low coal.
Low machine for conveyor loading, mounted on two rubber-tired dual wheels.
Electric car retarder with thruster operated brake.
Unmounted coal drill in permissible and open type.
Line-arc repeating sectionalizer.
Minimum length rail bonds.
Car spotting hoist with new worm gear reducer and non-reversible drive.
Arc welding machines with wide welding range (ten ranges with 100 steps operating in each range).
"Load Distributor"—automatic type of voltage regulation for motor generator sets.
Side drive reversible motion shaker conveyor.
Coal crusher of entirely new design.
Pocket size gas indicator.
Hand-operated instrument for dust sampling.
Oxygen breathing apparatus providing rescue work for full hour in unbreathable air.
Fused trolley tap with contact ball and special clamp.
Multiple junction box providing interlocking protection.
Hanger-mounted quick break switch.
Rubber-mounted automatic mine car coupler.
Complete shuttle car battery of new design.
New hand shovel of novel design.
Light weight section steel mine timber.
Light weight wrought steel mine car wheel.
Sectional turnout so constructed as to be moved easily from place to place.
Spun glass insulation.



• SAFETY FIRST SUPPLY CO.

Important safety devices, including E & J Resuscitator and Inhalator and a new machine developed for testing lenses. *In charge*—L. J. Biggs.

• SANFORD-DAY IRON WORKS, INC.

Full size SD Automatic Bottom-Dumping mine car operated on elevated track, arranged to display automatic opening and closing of doors over a bin; also company's ball bearing wheels, and models of large capacity rotary dump and end dump mine cars. *In charge*—George E. Jones.

• SHELL PETROLEUM CORP.

Display of company's coal treating process along with various Shell products that are widely used in this connection. Also complete line of company's mine lubricants.

• SIMPLICITY ENGINEERING CO.

A 5' x 12' Double Deck Simplicity Gyrating Screen equipped with suitable openings in each deck to make specification coal on a large scale capacity—in full operation. *In charge*—R. C. Johnson.

• S K F INDUSTRIES, INC.

Company's complete line of ball and roller bearings and transmission appliances. *In charge*—R. R. Zisette.

• STANDARD OIL CO. (IND.)

Company's complete line of mine lubricants and new Coal Spray Oil to prevent dusting and degradation. *In charge*—Fred Hamilton, Harry Sutherland, George Harmon and William Launtz.

• STEPHENS-ADAMSON MFG. CO.

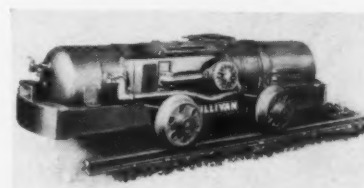
Company's improved Air Sand Coal Cleaning system—a model plant in actual operation; new ring type crusher designed to crack rather than crush coal to stoker size in one operation; and another version of the L-Type REDLER conveyor-elevator. *In charge*—Charles W. Hoefler, Jr.

• STERLING PUMP CORP.

Working model of Sterling deep well turbine pump as applied to mine dewatering; also cutaway models of inner parts of pumping unit, together with sample couplings. *In charge*—W. H. Boger.

• SULLIVAN MACHINERY CO.

Company's improved "Super" shortwall coal cutter, trackmounted coal drill, and mine air compressor in operation; also a display of room hoists, carpuller hoists and hand-held drills. Features of the mine car compressor illustrated are its compactness and such details of construction as "Long" axles, Timken wheel bearings, ball main



bearings, unit-in line construction of motor compressor and air receiver, push-button control and Miller cable connector, delivering air capacity of 85 c.f.m. and measuring only 26½ inches above rails. *In charge*—L. A. Layman.

• SUN OIL CO.

Company's dustproofing petroleum products for coal, coke and briquets, together with complete line of mine lubricants. *In charge*—H. H. Morris and J. V. Curley.

• W. O. & M. W. TALCOTT, INC.

Complete line of belt fasteners for conveyor, elevator and transmission belting; Talcott Acme Patch Fastener specially suited for repairing damaged belting; and photographic display of actual installations along with sections of belting spliced with Talcott Clinching Belt Fasteners. *In charge*—M. W. Talcott and G. W. Little.

• TAMPING BAG CO.

Seal-Tite Tamping Bags and the Dummy-Maker, a machine for filling tamping bags; and new shovel—the "Alphabetical" special. *In charge*—Richard I. Winn.

• TIDE WATER ASSOCIATED OIL CO.

Playlet performed by five animated puppets presenting story of company's products; and samples of company's complete line of coal mine machinery lubricants. *In charge*—Walter Sauer.

• TIMKEN ROLLER BEARING CO., THE

Complete range of tapered roller bearings as used in all sizes of mine cars, mine locomotives, conveyors, pumps, compressors and auxiliary equipment. *In charge*—E. C. Reither.

• W. S. TYLER CO., THE

Type 400 Screen for fine mesh screening of coal, and a Ty-Rock screen—a model entirely floating on rubber. *In charge*—G. R. Delamater.

• UNION CARBIDE & CARBON CORP.

Hard-facing applications manufactured by Haynes Stellite Co., that increase life of wearing surfaces, featuring application of Haynes-Stellite and Haystellite to coal undercutter bits. Welding and cutting blow pipes and various application of the oxyacetylene process of company's subsidiary Linde Air Products Company, and Miners' Lamp "Union Carbide." Also electric motor brushes and various carbon products of National Carbon Co., Inc.

• UNION WIRE ROPE CORPORATION

Samples of various kinds of wire rope used in coal mining industry, featuring a contest in which users of wire rope may participate in a test of their familiarity with various kinds and sizes of wire rope, with cash prizes to winners. *In charge*—M. D. Carrel and Harry Copas.

• UNITED ENGINEERS & CONSTRUCTORS, INC.

Joint exhibit with the Fairmont Machinery Company, featuring display of a scene-in-action exhibit, small model of the Chance apparatus, and pictures of installations. *In charge*—J. Dickerson Martin.

• UNITED STATES BUREAU OF MINES

Full size mine model showing a roof fall; display outlining the meaning of Federal Bureau of Mines' labels, and exhibit showing how a miner should determine the dustiness in his mine, with a working model to show when and where water should be used to allay dust. *In charge*—W. P. Reiden.

• UNITED STATES RUBBER CO.

Continuous motion picture entitled "Gift of the Jungle," showing how raw rubber is produced, featuring the type of people who milk the trees and carry on through to the shipment of the raw rubber. Also novel samples showing unusual constructions of U. S. Rubber wires and cables. *In charge*—H. B. Allison.

• U. S. STEEL CORP.

New light weight section steel mine timber suitable for use in room operations; new light weight wrought steel car wheel; a Cor-Ten mine car, showing how corrosion resistant steel used in its construction can be welded; steel rails, mine ties, sanymeyer mine jacks, Lorain steel mine posts and a range of wrought steel wheels; exhibits and data on Duro-line and other tubular products of the National Tube Company; Amerglas insulated magnet wire for motors and generators, with Amerclad electrical wires and cables, Tiger Weld rail bonds and American Tiger Brand wire rope. Cooperating in joint exhibit are American Steel and Wire Company, Carnegie-Illinois Steel Corporation, Columbia Steel Company, Cyclone Fence Company, National Tube

Company; and Tennessee Coal, Iron and Railroad Company. *In charge*—C. R. Moffatt.

• WEBSTER MFG., INC.

Belt conveyor idlers, featuring two types of troughing idlers—one the lubricated for life bearing, packed with grease and permanently sealed, and the other type fitted with Alemite equipment for periodical greasing; a section of heavy car haul to show quality and size of chain made by company for this service, and photographic display of Webster coal tippie equipment. *In charge*—Alex. Gamarra.

• WESTERN CARTRIDGE CO.

Company's complete line of blasting caps on modernistic, colorful and illuminated background panel. *In charge*—H. E. Mabry.

• WESTINGHOUSE ELEC. & MFG. CO.

Latest design of motors and control units for use above and below ground in coal mines; insulation material; line material; circuit breakers; a cutaway gear motor, and capacitors. *In charge*—P. H. Grunnagle.

• WEST VIRGINIA RAIL CO., THE

Complete line of sections of rails, ties, and splice bars; rail frogs and manganese frogs; new sectional turnout, a complete steel unit designed so as to be quickly moved, with either manganese or rail frog, riveted to steel ties and furnished with special joint bars enabling it to be readily taken apart in sections. *In charge*—J. B. Haskell.

Exhibits of additional equipment and supplies, covering a wide range of new equipment and key products, will be presented by the following companies, details of whose displays have not as yet been received.

AHLBERG BEARING CORP.
AIR REDUCTION SALES CO.
AMERICAN CHAIN & CABLE CO., INC.
CITIES SERVICE OIL CO.
COAL MINE EQUIPMENT SALES CO.
du PONT de NEMOURS & CO., INC., E. I.
FLETCHER & CO., J. H.
GIBRALTAR EQUIPMENT & MFG. CO.
GOULD STORAGE BATTERY CORP.
GRUENDLER CRUSHER & PULVERIZER CO.
GULF OIL CORP.
GUYAN MACHINERY CO.
IMPERIAL BRONZE MFG. CO.
JOHNSON-MARCH CORP., THE
MECHANIZATION, INC.
NATIONAL CARBIDE CORP.
OWENS-CORNING FIBERGLAS CORP.
SAFETY FIRST SUPPLY CO.
SCULLY STEEL PRODUCTS CO.
SOCONY-VACUUM OIL CO., INC.
STREETER-AMET CO.
TALLMAN MFG. CO.
TEMPLETON, KENLY & CO.
TOOL STEEL GEAR & PINION CO.
WATT CAR & WHEEL CO., THE
WEIR KILBY CORP.
WHITE & CO., INC., H. KIRK
WILSON WELDER & METALS CO.

Keeping Production Costs Down with LINK-BELT EQUIPMENT!

● For smooth, dependable low-cost materials handling and power transmission equipment—depend on LINK-BELT. We make everything for the complete conveyor, including the driving machinery, and shall be pleased to engineer and furnish the complete installation, or, if preferred, simply supply the parts desired.

Link-Belt's broad experience in the art of handling materials from where they are to where they are wanted next, is at your service. No inquiry is too large or too small to merit our painstaking attention.

LINK-BELT COMPANY

Chicago Philadelphia Indianapolis Atlanta San Francisco Toronto
Offices in Principal Cities 7712-A

● Above: Controlling speed of ore-feeder belt conveyor from mill storage bin to ball mill—with P. I. V. Gear infinitely variable speed transmission.

Right: 30' wide anti-friction belt conveyor handling 400 tons of minus 1" gold ore per hour, working 16 hours per day, or at the rate of 6000 tons per day—half of this volume being a circulating load. The tripper is of all-steel construction, completely automatic, electrically controlled.



Self-Aligning Idler keeps conveyor belt central



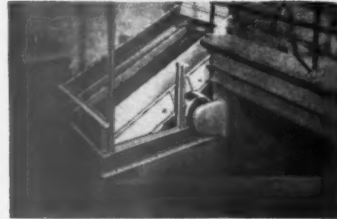
Belt Conveyor with travelling feeder



Picking ore on Apron Conveyor



Apron Conveyor delivering ore from bin to primary crusher



Vibrating Screen delivering ore to pan conveyor



Belt Conveyor type Feeder

LINK-BELT CONVEYORS

and elevators of all types... Feeders... Vibrating Screens... Shaking Screens... Skip Hoists... Portable Conveyor-Stackers... Roto-Louvre Dryers... Bucket Carriers... Speed-o-Matic Shovels-Draglines-Cranes... Elevator Buckets... Simon-Carves Coal Washeries... Complete Coal Tipple Equipment... Crushers... Rotary Dumps... Picking Tables... Loading Booms... Power Transmission Equipment... Chain Drives of all types—Malleable Iron, Promal or Steel... etc.



See our EXHIBIT at the COAL SHOW, Cincinnati, April 24-28, Spaces 103-109-111, South Hall

Large MINE CARS at New Buckhorn Mine of Consolidated

IN ADOPTING large mine cars, which are now in use at the Buckhorn mine of the Consolidated Coal Company, Williamson County, Ill., we were confronted with the problem of handling coal mined on a complete conveyor system. The coal is loaded by Joy loading machines onto flight conveyors in the rooms, these flight conveyors discharging onto a mother belt which runs down the length of the panel entry.

The problem, then, was the transportation of coal from the mother belt to the hopper at the bottom of the slope, which is equipped with a reciprocating feeder to give an even delivery of coal to the hoist belt.

As this operation was our first experience in conveyor mining, the wisdom of utilizing belt transportation on the main entry was somewhat doubtful. A belt in the main entry would have to be of sufficient size to carry all the coal delivered from the panel entries, which at times comes in considerable surges, inasmuch as the capacity of three loading machines would be delivered by one mother belt.

Track Haulage With 10-Ton Cars Decided Upon

In thinking the matter over, we decided that it would probably be wise to utilize track haulage along the main entries, said track giving us a means of taking in necessary supplies.

In choosing the size of a car, we decided first on a 10-ton car. It was also decided that a drop-bottom type of discharge would be more advantageous than a rotary dump in our particular set-up (Fig. 1). We further decided that we wanted the car mounted on only four wheels, and that we would use nothing less than 60-lb. rail, with no turn sharper than a No. 4 frog on 42-in. gauge. This information was set before several car builders, and the first reaction was that it would be necessary to use either eight-wheel trucks or articulating trucks. We ruled out the eight-wheel trucks, and the articulating trucks were discarded because, should we wish to load di-

● *Huge Cars of 10-Ton Capacity (15 Tons With Sideboards) Found Practicable for Main Haulage at Conveyor Operation of Consolidated Coal Company*

rectly into the car with a loading machine, the switching problem would be very difficult.

In due time, the car builders developed plans for a four-wheel car to meet our specifications of 10 tons, water level, with a 54-in. height, and a 7-ft. width. To our surprise, the necessary length was 21 feet from bumper to bumper. We laid this car out on the porch of the mine office, and at first glance we were convinced that it would be impossible to use a car of this size down below.

Models Demonstrated Practicability

However, we wanted a 10-ton, water level car, and so we laid out the entries to scale, made up cardboard models of the cars, and manipulated them along the layout. They seemed to work out very satisfactorily there, and so after checking the turns and satisfying ourselves that they would work, we had to worry about getting them into the slope. The difficulty here was that the material track turned off on a 60-ft. radius, as well as on a 60-ft. radius on the vertical curve. After due manipulation of our scale models, we were satisfied that we could get them into the mine, the only trouble being that the car would ride the bumper on the vertical curve for a distance of about 10 feet. This would not be troublesome, however, for once we had them installed in the mine, we did not intend to take them out.

Sideboards Increase Capacity to 15 Tons

Having satisfied ourselves along these lines, we began to wonder whether we had gone far enough; so we added the specifications that the car must be so constructed as to carry

By G. STUART JENKINS
General Superintendent
Consolidated Coal Company

10-in. sideboards, and a pay load of 15 tons. The final result was the large car which was shown by the Sanford-Day Iron Works at the 1938 Coal Exposition of the American Mining Congress: 21 feet over all, 7 feet wide, 54 inches high, four drop-bottom doors, discharging in a one, two, three, four action, and provisions for a 10-in. sideboard. Incidentally, with this weight it was deemed advisable by the manufacturer to include springs to take up any unevenness in roadbed, and to prevent derailing or unnecessary weaving.

When the cars were delivered, they went down below without a hitch, and were immediately put into service. They are run in groups of four, which are kept coupled together and handled as a unit. At the present time, we have only two units, or eight cars, and it is expected that the final necessary number, in all probabilities, will be only 12 cars, or three units.

Car Loading Cycle

In loading the cars, the head pulley of the mother conveyor was installed about 9 ft. in the air, and just over the near rail. This allowed the coal to load evenly into the cars. To facilitate the handling of cars, the track at the loading point was put on a 1.7 percent grade. This track is a siding off the main entry, thus allowing the locomotive to push the empty cars into the far end of the siding, then go around on the near end of the siding, and pick up the unit of cars that have already been loaded. The cars, during the loading process, are checked by a

suitable car retarder, and during the period of transition from one car to the next, the belt is not stopped. Spillage is prevented by the use of a piece of iron shaped very much like the roof of a dog house, one end of which is resting on the first car, and the other end resting on the second car; thus, any coal delivered will fall and slide into one of the two cars (Fig. 2). Having made the car change, there is a considerable period while the front end of the car is being loaded, which gives the loading station attendant time to move this roof down to a position for the next transition.

The cars at present are not being loaded to their maximum capacity, as we have not installed the sideboards; however, a check on the railroad weights as against the mine cars dumped gives a tonnage in excess of 11 tons per car, even after the coal has been cleaned.

No Derailments to Date

The cars were handled for some five or six months by a storage battery locomotive weighing approximately nine tons; but during the last few months this has been replaced by a 13-ton trolley locomotive in order to release the battery motor for handling material. During the time the cars have been in service, there has not been a single derailment, and during much of this time the cars were pushed as much as they were pulled, due to the cramped condition in opening up a new mine. We have decided not to install the sideboards until the haul gets long enough to make their use necessary, at which time we will have to brush the roof of the main entry to allow for the considerable surcharge of a car 7 ft. wide.

In dumping, the cars are merely run over the hopper, and the automatic tripper drops the bottoms, which in turn release the coal into the pit. The doors are automatically closed at the far end of the hopper, in return to be reloaded. The above-mentioned hopper holds between seven and eight cars, while the hopper at the next entry, which has not as yet been completed, will hold about 30 cars.

Recently we have adopted safety orange as the standard color for all mobile equipment. The visibility as compared to a black car is readily apparent in Fig. 3.

All things being considered, we are now wondering whether we should not have added on a few feet to the car in order to increase the capacity just a few more tons.

Large car over dump, with door in dropped position

Car under mother belt just after car transition has been made. Note "dog house roof" at left center, used to prevent spillage

A carload of over 11 tons of coal. Visibility of cars is increased by use of safety orange paint



DUCKBILL CONVEYORS Modernize Dawson Daylight Mine

THE Dawson Daylight Coal Company, realizing the general trend to underground mechanization to meet competition and lower costs, began investigation early in 1937 of various mechanized methods of operations and types of mechanical equipment which would be adaptable to their No. 6 seam mine, located near Dawson Springs, Hopkins County, Ky.

The No. 6 seam of coal in western Kentucky is restricted to rather limited economic mining areas. It is one of the lower measure seams, and about 300 ft. stratigraphically below the No. 9 seam, more generally operated in western Kentucky. At various locations in the field where operations are feasible, block faulting has lifted the seam near the surface, but in so doing has created undulations to the continuity of strike and dip of the bedding.

The No. 6 seam is exposed on the outcrop in the general drainage basin on the Daylight property. It is on this outcrop that the mine portal is opened to operate the mine. From this outcrop opening the seam is continuous to the south until it abuts a major fault. To the north it continues until it encounters another major fault.

Seam Undulations Enhance Mining Difficulties

The undulating condition of the No. 6 coal renders it extremely difficult to plan operations either for hand loading methods or mechanical methods. The average thickness of the coal is 4 ft. 2 in. The roof is blue shale, very hard in certain portions of the property but becoming irregular and disturbed in other portions of the property. Such abnormal roof conditions come in very abruptly in certain areas, and disappear as abruptly back to normal conditions. The disturbances of the roof consist of what are locally called "slips" or "horsebacks." When these conditions are encountered it creates dangerous and uneconomic mining conditions.

● Experiences With This Type Equipment in Low Coal With Variable Top and Bottom Indicate Practicability

By W. J. BORRIES
General Manager
Dawson Daylight Coal Company

With these occasional abnormal physical conditions of the No. 6 seam known to the management, it became extremely difficult to select such type of mechanical loading equipment which would adapt itself to these varying conditions. The management, therefore, after making investigations of various types of mechanical loading methods and equipment, recommended the shaker type of conveyor with duckbill attachment for loading coal.

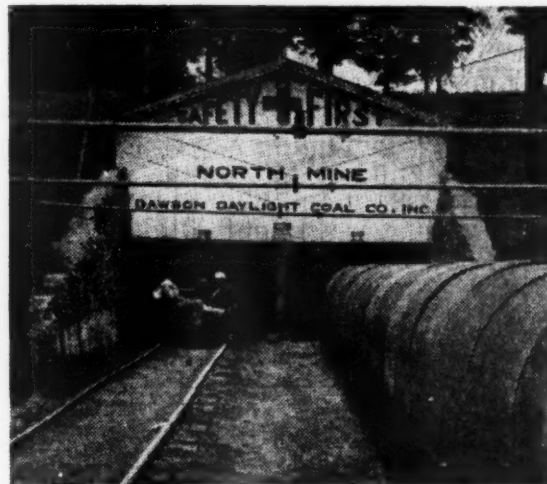
Two Conveyor Units for Development

Two duckbill shaker type of conveyor units, manufactured by Goodman Mfg. Co., were installed in our No. 6 seam mine on April 23, 1938.

These two units were placed to develop a mechanical loading section of the mine during the summer period, in anticipation of installing further mechanical units by the end of the summer. It was anticipated that these development units were to open sufficient area to supply the market demands of the sales department by the heating season. These two units are the 12G1/2 with No. 1 pan line and the latest type of duckbill equipment available from the manufacturer at that time.

These two units proceeded to develop entries, cross cuts and room necks, and were placed in parallel entries with a single discharge point into mine cars by means of a 90° angle trough. The record from April 23 to July 1

Coal leaving the all-conveyor mine of the Dawson Daylight Coal Co. is protected completely from the weather by metal sheathing



amounted to the driving of 4,655 lineal ft. of entry and cross cuts. During this period 10,148 tons of coal were produced from these development entries, and 75,000 tons were made available for later room mining. An average of 243 tons per shift, or 40.5 tons per unit per 7 hr. shift, was secured during this period. These units averaged three move-up shifts per month, which is included in the above figures. Considering the fact that the employees were inexperienced in mechanical operations, and had had no prior experience with shaker conveyors, it was considered by the management at that time and under such circumstances, that the results were within expectations. Later tonnages, however, secured from entry driving, when conditions were normal in the mine, exceeded these figures, when 80 tons per shift was secured in 7 hours.

These entry units proceeded at the above rate of production until about the middle of July, when the entry encountered extremely unfavorable conditions as to top and grade. The condition of the top became abruptly very dangerous, requiring excessive timbering, and the coal took a dip of 6 percent for a distance of 400 ft. However, even under such conditions the duckbill crew advanced the entries at a fair rate, but production per unit necessarily decreased.

Four More Units Added for Room Operations

During the month of August, 1938, four additional shaker conveyors of the same type were installed for room operations.

The management first placed two units in parallel rooms, using one crew between the two rooms. This crew consisted of a machine runner and helper, loading machine runner and helper, and hoist man. It was anticipated that by operating these two units with one crew, the cutting machine crew would have completed cutting, drilling and shooting of one room by the time the loading crew had loaded out the coal from the adjoining room, and thus the loading operation would have been continuous. However, when abnormal roof conditions entered this section the entire plan was upset, and the management soon discarded this plan of operation. Each loading unit was thereafter moved to individual rooms and the crews placed upon their individual responsibility for their particular unit and working place.

The first development entries included room necks driven on opposite



Coal discharging to belt from shaking conveyor

sides of the entries, and one entry equipped with double track haulage. This double track permitted the movement of mine cars past the loading point at each of the duckbill units.

The four room units were first placed on the side of the entry where the advance of the room from the entry was on the down grade to the working face. This arrangement proved unfortunate, because it was later experienced that when operating shaker type of conveyors down the dip of the seam from its discharge point, the capacity was decreased.

Summarized Time Study

A time study was made of the operations of a room unit under these conditions, with the results summarized in Table 1.

TABLE 1.—SUMMARIZED TIME STUDY OF ROOM UNIT RUNNING DOWN GRADE TO ROOM FACE

Width of room at face.....	27 ft.
Thickness of coal.....	4'2"
Depth of room from entry at time of time study.....	200 ft.
Down grade to room face.....	4%
Bad top conditions, requiring excessive timbering, but no water.	

Division of the time at which part of the crew, or all of the crew were at intervals engaged was as follows:

Total loading time.....	242 min.
Total drilling time.....	85 min.
Total shooting time.....	15 min.
Total timbering time.....	168 min.
Cleaning of kerf.....	41 min.
Pan line extensions.....	21 min.
Total tonnage in 7 hr. shift..	72.5 tons

This was secured from three and one-half falls of coal, in which there were four cuts by the cutting machine crew. This test indicated the capacity of the pan line up this 4 per-

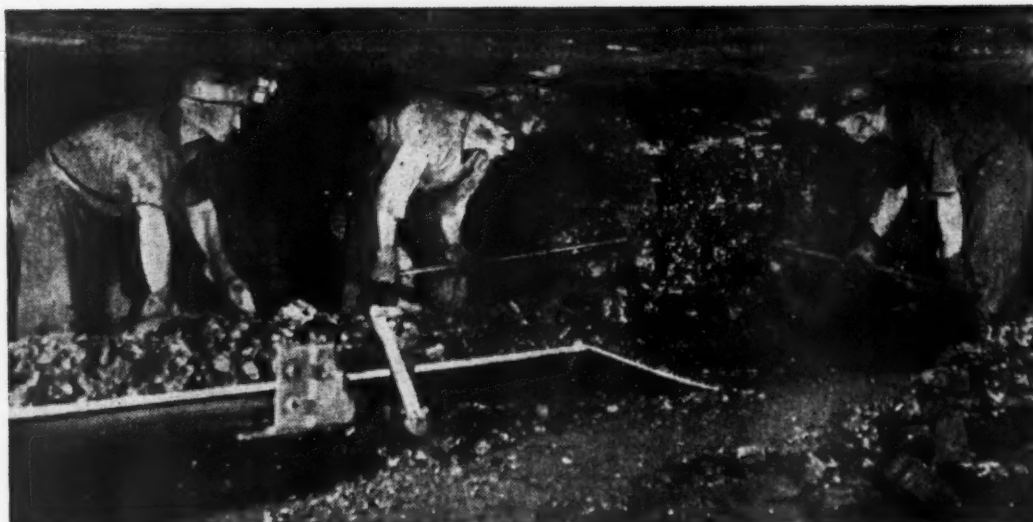
cent grade during the shift to be 18.0 tons per hour. A later time study made on another room on the same side of the entry, having a grade of 5 percent, gave a capacity of 15.6 tons per hour. When the four units depleted the down grade section of this panel entry, and were moved to the opposite and up-grade section of the entry, it was found that the capacity of the shaker units was increased to 35 tons per hour. It became obvious to the management that to successfully operate this type of equipment, grade conditions must be favorable. Future development panels are now projected so that all operating rooms are on the up grade.

A typical month's production of the entire six duckbill units working in both entries and room is tabulated for the month of January, 1939, in Table 2.

TABLE 2.—PRODUCTION OF SIX CONVEYOR UNITS FOR TYPICAL MONTH—JANUARY, 1939

Unit No.	Tons	Shifts	Av. Per Shift
Entry—			
No. 1 day.	989.55	21	47.12
No. 1 night	975.50	24	40.65
Entry—			
No. 2 day.	795.35	21	37.87
No. 2 night	959.85	20	47.99
Room—			
No. 3 day.	1,457.80	21	69.41
No. 3 night	1,691.05	20	84.55
No. 4 day	1,445.55	20	72.27
No. 4 night	1,373.60	20	68.68
No. 5 day	1,621.40	21	77.21
No. 5 night	1,522.80	20	76.14
No. 6 day	1,547.05	20	77.35
No. 6 night	1,580.45	20	79.02

The average for all room units during this month was 75.57 tons per shift, while the entry units produced only 43.25 tons per shift. The entries during this period were in bad roof conditions and required extra cross bars.



Duckbill loading at the face

These shifts also include the time of moving up the units on entries, and moving of units from one room to another.

During the month of February, with more experience behind the loading crews, the experience of one loading crew is shown in Table 3.

TABLE 3.—PRODUCTION RECORD OF ONE CONVEYOR UNIT IN FEBRUARY, 1939

Date	Day Shift	Night Shift
	(Tons)	(Tons)
Feb. 4	75.6	99.60
6	148.45	39.95
7	141.20	92.85
8	85.70	82.30
10	106.65	79.35
13	70.60	76.65
14	5.50	*21.15
16	70.35	68.30
17	91.05	87.95
20	99.85	101.15
21	135.60	82.25
24	87.75	88.40
25	105.35	85.10
27	16.90	148.35
28	67.70	29.65
Total tons	1,308.25	1,183.00
No. shifts	15	15
Av. tons per shift	87.21	78.86

* Breakdown.

During this period this crew worked out the No. 2 and No. 3 rooms. These rooms were driven 30 ft. wide and 300 ft. deep. The average life of a room at this rate of production is 7½ days.

This tabulation represents the work performed by a room unit operating on a day and night shift. It will be noted that each crew operated 15 shifts; that the average tons produced by the day shift was 87.21 tons, while the night shift averaged 78.86 tons.

Fourth Man on Crew Found Advisable

Better results were obtained by increasing the number of employees at the operating face from three to four men. The operations started with the three man unit at the face, but due to the abnormal roof conditions, lack of proper timbering when required, and also to take up the slack lost time of the original three men, the fourth man added to this crew was found to be economical. This fourth man's duties consisted principally of maintaining permanent timbers and setting the screw jack safety timbers at the working face, assisting in drilling, preparing shots, bringing up pan lines, extending ventilation tubes and securing supplies. The company was unfortunate in experiencing two fatal accidents by reason of bad roof conditions, and this further prompted the addition of the fourth man.

Roof Jacks Added to Safety

All units are allotted six roof jacks which are shifted from place to place in the movement of the duckbill conveyor, and carried forward as the operating face is advanced. These roof jacks have unquestionably taken the fear out of the men, and added a safer means of mining.

The management feels that they have not had sufficient length of operating experience to definitely state a repair or maintenance cost of this type of equipment at this time. Our breakage experience has been entirely with the troughing pans and connec-

tions. Misalignment of the pan line and lack of sufficient hold down carriers caused buckling of the pans with the result that breakage occurs at the eye straps. We find it very necessary, particularly where the bottom is undulating, to place the hold down carriers at close intervals to avoid such breakage. The manufacturer is recently introducing a lug which is now attached to each connecting pan and held down to the ball frame carrier in order that each pan connection may be braced and supported, thus preventing misalignment.

Our experience with the shaker type of conveyor at this stage of our operations, in a low seam of coal, with variable top and bottom, indicates that our selection of such type of equipment for our purpose and conditions, has been logical.

Amateur Contest of Hanna Coal

The largest crowd ever to attend a Hanna Amateur Contest recently gathered in the auditorium of the St. Clairsville, Ohio, high school for the annual talent program and drawing of the president's safety award of the Hanna Coal Company.

R. L. Ireland, Jr., president of the Hanna Company, spoke briefly, expressing appreciation for his cordial reception and for the spirit of co-operation in the general safety campaign of the past year. He presented the \$500 cash award to the three winners of the grand safety prizes.

The best inspection grade for the past year in connection with the safety campaign was presented to the Willow Grove mine by R. V. Clay, general manager of the company. W. J. Walker acted as toastmaster.

WHEAT Pioneers Again, with:

Centralized Sales and Service Devoted Wholly to Wheat Electric Cap Lamps

New Policy Places Eastern and Mid-Western Bituminous Fields under A. C. Dick and Trained Staff Handling Wheat Lamps Exclusively.

Wheat is pioneering again.

Effective February 1, 1939, the Sales Promotion and Service of Wheat Electric Cap Lamps in the Eastern and Mid-Western Bituminous fields will be under the direct personal supervision of A. C. Dick and a trained staff handling Wheat products exclusively.

This new policy establishes for the first time in mine lighting history a centralized sales and service devoted wholly to the electric cap lamps of one manufacturer and entirely without any other interests.

This policy is another example of Wheat pioneering. Wheat was first with constant potential—brighter light that does not fade; Wheat was first with the cap lamp which can be charged without removing the battery cover; Wheat was first with the emergency bulb; Wheat was first with a 4-volt battery; Wheat

was first in self-service lamphouse equipment.

And now Wheat is first with centralized Sales Promotion and Service devoted wholly to Wheat Lamps and entirely without other sales or service interests.

Sales Promotion and Service in the Eastern and Mid-Western Bituminous Fields will be under the direct supervision of Mr. A. C. Dick and a trained staff of assistants, with headquarters in Pittsburgh and other offices strategically located in important mining centers.

This change, the first of its kind in mine lighting, will serve to bring Wheat users and friends into more immediate contact with new Wheat developments which will be introduced during 1939.



WHEAT

The Lamp for Productivity with Safety

ELECTRIC CAP LAMPS

KOEHLER MANUFACTURING CO. MARLBORO, MASS.

A. C. DICK, 207 Investment Building, 239 Fourth Ave., Pittsburgh, Pa.

E. D. Bullard Company, San Francisco, California

H. C. Burton & Company, Hamilton, Toronto, Montreal, Swastika, Canada

Oldham & Son, Ltd., Denton, Manchester, England

With the COAL DIVISION

of the AMERICAN MINING CONGRESS

CONSTRUCTION and MAINTENANCE of MAIN HAULAGE ROADS

THE Committee on Main Haulage Roads has been engaged for the past several years in a series of studies covering materials and construction methods that have been used by a number of coal companies for their underground transportation systems. Reports on these studies are being published in booklet form by the American Mining Congress and are available for distribution to the coal industry.

The book contains approximately 100 pages of cuts and text and is pocket size for the convenience of engineers, superintendents, and track foremen. Through the presentation of engineering data, dimension drawings, assemblies of track parts, specifications and sizes of various track materials, it can be used underground for construction and track layouts, as well as for office reference. The following list of contents shows the wide scope that the reports cover:

Committee Report on Underground Examinations:

Report on Ballast.
Report on Drainage.
Rail and Track Accessories.
Track Inspection and Maintenance.

American Mining Congress Recommended Practice:

Specifications for Mine Ties.
Specifications for Switch Ties.
Wood Ties for Turnouts.
Steel Ties for Turnouts.
Switch Splice Bars.
Guard Rails.
Gage Rods.
Elevation of Rail on Curves.
Widening Track Gage on Curves.
Bolted Joints and Rail Braces.

Accepted American Standards for Frogs, Switches, Turnouts:

Riveted Frogs.
Cast Frogs.
Bolted Frogs.
Switch parts and assemblies.
Turnout formulas and dimensions.

The committee submits the following foreword in presenting this booklet.

Foreword

An efficient transportation system is a major necessity in modern coal mining, and the reports submitted here have compiled the essentials that enter into the construction and maintenance of main-line haulageways. These reports were prepared by the American Mining Congress Coal Division Committee on Coal Mine Haulage Roads, and their publication in booklet form was approved by the Coal Division at their meeting on December 3, 1938. For convenience in their presentation, the reports are divided into three classifications—Underground Examinations, Recommended Practice, and American Standards.

The "Committee Report on Underground Examinations" is based on mine inspections made by several members of the committee during the latter part of 1937. These inspections covered representative types of materials and construction methods as used for main haulages under different service conditions in 17 bituminous mines in the States of Pennsylvania, West Virginia, Ohio, and Illinois—operated by 12 companies and having a combined daily capacity of 159,100

tons of coal. The reports contain the conclusions drawn from these observations and from additional information obtained from the managements of the mines examined.

The reports on "American Mining Congress Recommended Practice" were prepared after considerable study of data and service records on practices which have been proven successful by various users over a number of years. These recommendations are further based on the experiences of manufacturers in designing, fabricating and servicing the track equipment described.

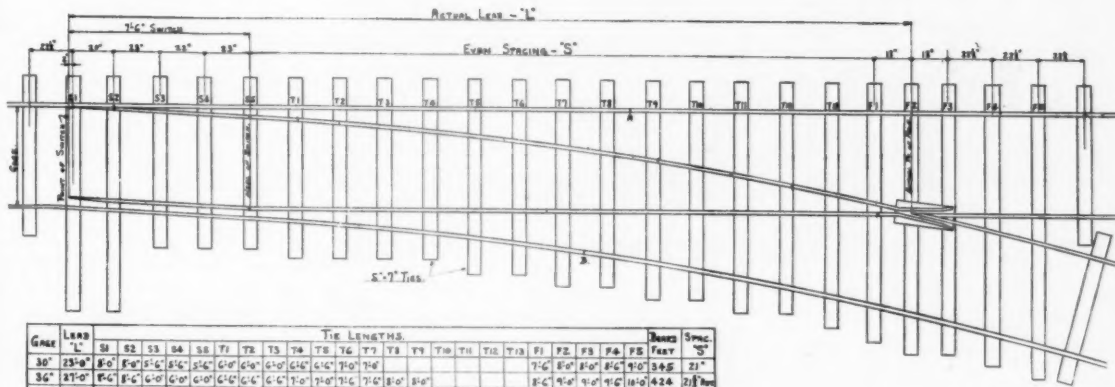
The reports on "American Standards for Frogs, Switches and Turnouts" were prepared several years ago, and in 1934 were accepted as recommended practice by the American Standards Association.

The entire series presents, in concise form, the practices in main haulage road construction and maintenance that have been proven economical and practicable for coal-mine service, and it is the belief of the committee that these recommendations, which are based on actual experience, are authoritative in indicating the types of material and construction methods that can be successfully applied underground.

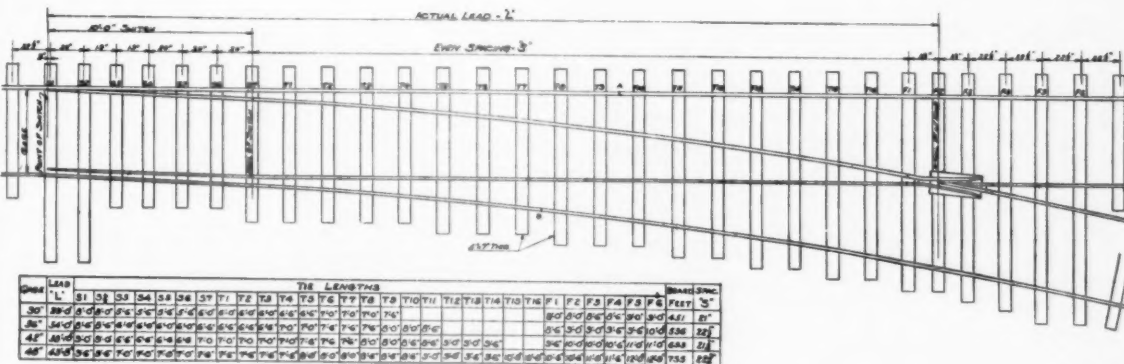
Submitted December 2, 1938, by Committee on Mine Haulage Roads.

R. V. CLAY, Hanna Coal Co. (chairman).
L. C. CAMPBELL, Koppers Coal Co.
M. D. COOPER, Hillman Coal & Coke Co.
W. W. DARTNELL, Sullivan Machinery Co.
C. C. HAGENBUCH, Hanna Coal Co. of Ohio.
J. B. HASKELL, West Virginia Rail Co.
SHELLY G. HUGHES, Differential Steel Car Co.
H. B. HUSBAND, Chesapeake & Ohio Railway Co.
E. H. JENKS, Rochester & Pittsburgh Coal Co.
J. M. JOHNSTON, Bell & Zoller Coal & Mining Co.
A. R. JOYCE, Wood Preserving Corp.
R. G. PFAHLER, Berwind-White Coal Mining Co.
J. H. SIEBERT, Carnegie-Illinois Steel Corp.
J. R. ULRICH, Bethlehem Steel Co.
G. B. SOUTHWARD, American Mining Congress.

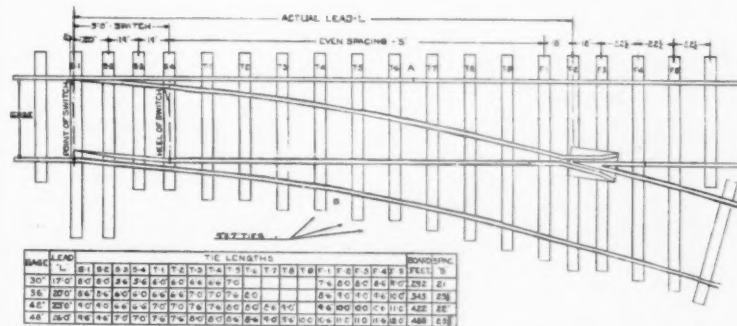
Standard Switch Tie Sets For Main Line Haulage



No. 6 Turnout—Submitted by J. R. Ulrich



No. 5 Turnout—Submitted by J. R. Ulrich



No. 4 Turnout—Submitted by J. B. Haskell

COAL DIVISION
THE AMERICAN MINING CONGRESS

Switch Tie Layouts
for
Main Line Haulage
with
Standard Gages

Committee on Haulage Roads
February, 1939



Head frame, hoist house and change room
at the Campbell shaft of Phelps Dodge at
Bisbee, Ariz.

ACCIDENT PREVENTION PRACTICE of Phelps Dodge Corporation*

PHELPS Dodge Corporation has been engaged in accident-prevention work for more than a quarter of a century. In 1913, when safety work was inaugurated at one of its mining properties, industrial accident-prevention work was in its infancy, and it was difficult to convince either employer or employee that accidents could be prevented.

The U. S. Steel Corporation, the recognized pioneer in industrial safety work, and a number of the larger industrial companies had introduced accident-prevention work several years prior to this time, and the results of their efforts were just beginning to attract attention. The National Safety Council, which has done more than any other agency to promote public and industrial safety, was just being organized, and this year is celebrating its silver anniversary.

During the subsequent years we have seen the industrial safety movement develop from this small beginning to its present day status, where practically every industrial concern of any consequence is engaged in some form of accident-prevention work.

As a measure of accomplishment, available accident statistics indicate

● *Committee System in Use Found Very Effective as Attested by Greatly Improved Accident Record*

By H. C. HENRIE

General Superintendent
Copper Queen Branch, Mines Division
Phelps Dodge Corporation

that industrial fatalities have been reduced 44 percent during this 25-year period, and that the national industrial frequency rate has decreased 61 percent during the past 12 years.

Accident Prevention in Mining Difficult

Although the accident rate of the mining industry has shown a gratifying decrease, statistics indicate that it is still the most hazardous occupation in which large numbers of persons are employed. It is generally recognized that, due to the nature of the work, the prevention of accidents in mining operations is far more difficult and complicated than in other industries. However, the many excellent safety records established by individual coal and metal mining companies during recent years have demonstrated that

accident-prevention work, properly organized and conducted, can make mining operations as safe as the majority of other industrial pursuits.

At several properties of the Phelps Dodge Corporation it is not an uncommon occurrence to find that during a given period more employees are injured off duty than on the job, indicating that the average employee is less susceptible to injury while working than during his leisure hours.

In the early years of our safety efforts several systems of administering the work and many methods designed to stimulate interest and promote safety education were tried with varying degrees of success. Progress made, however, was not satisfactory, due to the tendency of the supervisory staff to regard accident-prevention work as the safety inspector's job instead of a job for the entire organization. This

* Presented to Metal Mining Convention of the American Mining Congress, Western Division, Los Angeles, Calif., Oct. 26, 1938.

lack of interest and cooperation shifted the entire burden to the safety department, which was unable, single-handed, to obtain the desired results.

Safety Work Reorganized

In 1925, in order to correct the prevailing unsatisfactory situation, the plan of administering safety work was reorganized, and a committee system, modeled after a plan used for many years by the U. S. Steel Corporation, was adopted. The beginning of permanent improvement dates back to the adoption of this plan.

During the year 1924 there were 2,829 accidents at the various coal and metal mining properties of the corporation, with a resulting frequency rate of 1.11 accidents per thousand-man shifts worked. In the nine succeeding years the accident-frequency rate decreased steadily, only 13 accidents occurring in the year 1933, with a frequency rate of 0.039 accidents per thousand-man shifts worked. This represented a decrease of 96.5 percent from the 1924 experience. However, during the latter year mining operations were conducted on a greatly reduced basis, and the personnel consisted largely of long-service employees, so the principal value of the foregoing figure is to indicate what can be accomplished with an experienced, safety-conscious organization.

Since 1933, the expansion of operations has resulted in the employment of a large number of men, many of whom had no previous experience in mining. This condition necessitated a more intensive training and educational program.

During 1937, at all metal and coal mining branches of the corporation, 167 accidents occurred, with a resultant frequency rate of 0.077 accidents per thousand shifts, a decrease of 93.0 percent below the 1924 rate. The accident-severity rate during the same year was 2.31 percent.

Plan of Safety Organization

The present system of administering safety work, which was adopted in 1925, was designed to correct certain weaknesses in our former procedure. As our previous experience had very definitely indicated that the responsibility for effective accident-prevention work rested primarily on the executive officers and management of the company, it was felt that if this group would devote a reasonable amount of time to safety work, the accident

record of the corporation could be improved. To accomplish this objective, a committee known as the corporation safety committee was established.

This committee, consisting of the vice president of the corporation, the general manager of the corporation, and the managers of the various branches, is responsible for the administration of the accident-prevention program. Meetings are held approximately every four months, and are arranged so that the committee visits each of the different branches or subsidiary companies in rotation. At these meetings, the accident-prevention work of the various branches is reviewed, the accident record of the corporation analyzed, and methods for improving practice and new innovations studied. During these visits a meeting is held with the branch safety organization, and an inspection of local operations is made.

Methods and Practices Standardized

This committee has now been functioning for a period of 14 years, and has been successful in developing a definite and uniform safety policy. Through it, methods and practices at the various branches have been standardized to a very large degree. The active participation of the management group has been in a large measure responsible for the excellent progress made in reducing the accident rate of the corporation and in creating what we believe to be a safety-conscious organization.

At each branch or subsidiary company there was established what is known as the branch general safety committee. This committee, consisting of the local branch manager, who acts as chairman, and the superintendents and department heads, is responsible for the proper administration of accident-prevention work at the branch. Through this committee, matters of policy, methods, and procedure developed by the corporation committee are carried directly to the departmental operating heads. Meetings are held at least once a month, at which time the branch accident record is reviewed, accidents analyzed and classified, methods for improvement discussed, and specific hazards and existing practice studied. Recommendations submitted by the departmental safety committees, many of which involve the expenditure of money, are discussed and passed upon.

In each major department of the branch, such as the mine, mill, and mechanical departments, there were established departmental safety committees which consist of the superintendent, who acts as chairman, and the supervisory staff of the department. Each departmental committee is responsible for the accident-prevention work in its department.

Departmental Committees Key Organizations

The departmental safety committees are the key committees of accident-prevention work and are the mediums through which it is made a routine



Junction yard, shops and timber storage

part of the operating duties of the supervisory staff. These committees meet at least once a month, at which time all accidents occurring in the department are analyzed and classified, and methods developed to prevent repetitions of similar accidents. Methods for improving existing practice and elimination of possible hazards are studied.

In each operating unit of the department, such as a shop or mine division, a workmen's safety committee carries the accident-prevention program directly to the day's-pay employees, thus securing their interest and cooperation. This committee consists of the foreman, as chairman, bosses, and workmen representing the day's-pay employees of the unit. It investigates, analyzes, and classifies accidents occurring within its department.

The workmen's committees have been a prolific source of suggestions and recommendations relating to the improvement of practice and the elimination of accident hazards. Committeemen representing the workmen serve for a three-month period, and through a system of rotation an ever-increasing number of workmen are brought into direct contact with the safety program, which is an important educational measure.

The plant safety engineer acts as secretary for all plant safety meetings, compiles accident reports and statistics, and, in conjunction with the departmental safety committees, investigates all accidents. In general, the safety department has full charge of first-aid and mine-rescue training and acts as a service department for the entire plant.

After a number of years of experience with this type of safety organization, we are convinced that the committee system of administering accident-prevention work is basically sound, and, when properly directed, results in making safety work an essential part of the operating duties of the supervisory staff. It also results in securing the cooperation of everyone in the organization, management, supervisory staff, and workmen in the safety program.

Methods of Procedure

We have found that complete and accurate information covering the accident experience of the various plants and operations is fundamental to effective procedure. A detailed written report is required on every accident, irrespective of how slight the resulting injury may have been. Employees fail-

ing to report an accident promptly to their boss are subject to discharge.

In order to obtain this information, the safety inspector investigates every accident, and he may call on members of the safety committee of the department concerned for assistance, and on any other persons having knowledge pertaining to the accident. After viewing the scene of the accident and securing all available information pertaining to it, the investigating committee classifies the accident as to cause, and places the responsibility on the proper parties. A full report on the accident is then written by the safety inspector.

All accidents are thoroughly discussed and analyzed by the departmental safety committee in order to ascertain just how the accident occurred, the circumstances contributing to it, and the parties responsible. By analysis of an accident, we mean a study of the particular work being performed, a survey of the equipment used, the method of preparing for the work, the personnel involved, and all the contributing causes which it is possible to obtain. The findings and recommendations of the departmental safety committees are reviewed by the general safety committee of the plant.

Careful Accident Analysis Indicates Remedy

The information secured through this system of analysis invariably indicates the remedy by which a similar type of accident may be avoided. This remedy may be additional mechanical safeguarding, the elimination of unsafe tools or equipment, or in other directions that constitute an engineering problem. Again, it may indicate unsafe practice, the need of more complete instruction as to safe methods of doing the work, closer supervision, laxity in enforcement of safety rules, or the need of disciplinary action.

After reaching a certain point in the reduction of accidents, further progress is largely dependent upon the ability of the safety organization to recognize unsafe practices and to correct them before an accident occurs. The analysis of "No Lost Time" accidents presents a fertile field in which to uncover unsafe practices. In passing, it may be noted that the difference between "No Lost Time" and a fatal accident is often very slight.

In analyzing accidents, we have observed numerous cases where an employee, through lack of knowledge or instruction, was doing his work in the wrong manner. As a consequence,

it was necessary to make job studies of the more common operations where it seemed that practice could be improved. Committees composed of superintendent, foreman, and bosses studied the movements connected with a certain job or operation and agreed on what they considered to be the most efficient and safest method of performing the work, after which the workmen were instructed to follow this method.

The following illustrations are examples of the practical application in present-day practice of the information obtained by thorough investigation and analysis of accidents:

Protective Clothing Effective

The required use of protective clothing has resulted in marked decreases in certain types of injuries. In 1925, it was ascertained that eye, foot, and head injuries were the contributing causes of 28 percent of the disabling accidents during the year. To correct this condition, the use of goggles was made compulsory on certain jobs; safety hats are compulsory for all underground employees; and safety shoes for both underground and surface work. During recent years these types of injuries have been practically eliminated. The wearing of woolen underclothing by certain groups of employees engaged in smelting operations was insisted upon as protection from splashes of molten metal, sparks, and hot calcined material. After several employees were saved from a serious or fatal injury due to these articles of protective apparel, little difficulty was experienced in enforcing their use. Accidents due to burns decreased from 69 in 1925 to 3 in 1937.

In 1925, in metal mining operations there were 222 accidents resulting from falls of ground. During 1937 there were 9 such accidents. This decrease was accomplished by the use of Dura-aluminum bars, which, being about one-third the weight of steel, permitted the use of longer bars and lessened the fatigue of the operation; better illumination, including electric lights in stopes, which permitted more thorough inspection of backs; teaching men where to stand and how to bar down safely; and insistence by bosses that working places be thoroughly barred down.

In operations connected with underground haulage, 146 accidents occurred in 1925 and 8 in 1937. In this operation, improvements in the design of safety doors will undoubtedly prevent many serious and fatal accidents.

In the same manner, accidents occurring in handling rock and ore, including loading at chutes, were reduced from 203 in 1925 to 9 in 1937, and those due to powder smoke and gas from 6 to none for the past six years.

Educational Measures

Considerable attention and effort has been devoted to the problem of safety education. Of the many methods tried, the most effective results have been obtained through direct contact between the safety inspector or boss and small groups or individuals. The employment of relatively large numbers of inexperienced men, which often takes place in a short period of time, necessitates additional efforts.

Talks to new men are given by the safety inspector. As many of these men are entirely inexperienced, a great deal of patience and explanation is necessary, and many elementary details must be covered, such as how to light and handle a carbide or electric cap lamp. At lunch time, talks on safe practice and safety rules are given to relatively small groups. Employees are also examined as to their knowledge of the safety rules, and in certain occupations, such as motormen, on their proficiency and knowledge of their duties.

In order that safety rules and standard methods of procedure be strictly enforced, discipline is a necessary adjunct to safety work. Regardless of whether the employee is a foreman, boss, or workman, if, after instruction, he fails to show proper interest or cooperation, it is necessary to take disciplinary action.

Maintaining Interest

First-aid instruction has been found to be of considerable value in stimulating and maintaining interest in the safety program. This instruction has been available to the employees of the corporation for many years, and since the year 1930, first-aid training has been compulsory, with the result that employees are at the present time practically 100 percent trained in first-aid methods. In addition to first-aid training, a large group thoroughly trained in mine-rescue work is available for emergency calls.

Safety competitions whereby the various subsidiary companies compete for safety trophies have been powerful factors in maintaining interest. Six different branches or subsidiary com-



Phelps Dodge general office, hotel, hospital, Y. W. C. A. and Y. M. C. A. at Bisbee, Ariz. High School in distance

panies compete for safety trophies which are awarded to the branch having the best frequency record and the best severity record. Accident records are computed on both a frequency and severity basis. The frequency record is expressed in the number of lost-time accidents per 1,000 shifts worked. Under the standard method of compiling accident statistics, a lost-time accident is defined as an accident where the employee does not return to his regular job the shift immediately following the accident. Severity records are tabulated in accordance with the scale adopted by the International Association of Industrial Accident Boards and Commissions. No safety bonuses are paid either to supervisory staff or workmen.

The safety program of the corporation contains nothing new in practice or methods. We have not resorted to the emotional or revival-meeting type of appeal in an effort to stimulate interest, and accident-prevention work is handled in the same routine manner as are other operating problems.

We feel that the present plan of safety organization has been largely responsible for the reduction in our accident rate during the past 12 years, since this system of administering the work, by bringing the entire organization into direct contact with the accident-prevention program, has resulted in creating a safety-conscious organization.

We have also found that if all accidents, both lost-time and no-lost-time, are properly reported, investigated, analyzed, and classified, the line of

action which must be taken by the different units of the organization are clearly pointed out, and unsafe practices that escape the vigilance of the supervisory staff will become apparent through this procedure.

Constant and repeated instruction as to the safest and most efficient method of performing the work rests with the boss. These instructions must be detailed as to the job at hand, including the pointing out of hazards that may be encountered and the manner of handling them. Insistence on making the working place safe at the beginning of the shift is of the greatest importance.

Adequate supervision must be provided. The degree of contact between the boss and workmen varies with the nature of the work. Some jobs recognized as extraordinarily hazardous require a boss in attendance at all times.

Proper and impartial placing of the responsibility for accidents leads to a better coordination of the work between departments and individuals, develops safety-consciousness, and assists in the proper placement of personnel.

Discipline for failure to comply with safety rules or instructions is an important factor in the success of safety work. Circumstances surrounding the specific violation must necessarily determine the action taken. In many cases warnings to those involved are sufficient. In other cases a lay-off or discharge is indicated. However, the disciplinary action must be without discrimination as to job or length of service.

HEALTH CONSERVATION of the Metal Miner*

THE subject of health conservation of the metal miner has been viewed from many positions. To the medical profession, it provides an almost new field for research into the physiochemical reactions and physiological effects of mine atmospheres. To the members of the legal profession, it presents new complications of law and interpretations thereof. To the mine operator and engineer, it involves a problem in mechanics which forces upon him the necessity of acquiring some degree of familiarity with both the legal and medical fields of human endeavor, and the practical problem of meeting the situation as to working conditions deemed essential by the medical profession.

Health Problem Not New to Mine Operator

To the mine operator, however, this problem is not as new as recent widespread consideration of occupational diseases might indicate. The conservation of health of the metal miner is

* Presented to Metal Mining Convention of the American Mining Congress, Western Division, Los Angeles, Calif., Oct. 26, 1938.



● Duty of Mine Operators to Exert Every Effort to Obtain Best Practical Working Conditions—Effective Methods of Anaconda in “Stopping the Dust” Outlined

By WM. B. DALY

Manager of Mines
Anaconda Copper Mining Company
Butte, Mont.

a very much broader subject than the single phase of the one occupational disease peculiar to metal mining would indicate, and although recent concentration of attention upon this phase has served to divert attention from the others, the health problem is not new to the operator. It has always been a more or less hidden factor in his operating costs. We do not know how much the incidence of the so-called venereal diseases have contributed to the cost of accidents, or how much influence the use of alcoholic stimulants has upon the incidence of silicosis, nor how many fatal accidents have been directly due to heart ailments and kidney disorders. These things are so intimately related in the general scope of health conservation of the metal miner, that each of them is an integral part of the whole. These matters, however, are not peculiar to metal mining. They exert their influence in all industries. Therefore, we must narrow our subject down to the conservation of health of the metal miner with respect to peculiar health hazards of metal mining.

It is my opinion that many of these related health problems will solve themselves as a sequence to the requirements of the solution of the silicosis problem. I refer particularly to the widespread agitation for occupational disease compensation laws.

Liberal use of water sprays at Anaconda's Butte mines has been very effective in "stopping the dust." Shown is a standard compressed air-water blast used during blasting in cross-cuts and drifts



WM. B. DALY

Compensation Laws Greatly Broadened Employers' Responsibilities

Prior to the adoption of the workmen's compensation laws, the injured workman could recover damages from his employer for personal injury only by proving negligence. The employer was liable for his own negligence, but not for the dangers of the employment. Neither was the employer liable for personal injury due to the contributory negligence of the injured man's fellow employee. The adoption of workmen's compensation laws made the employer an insurer of his employee against accidental injury due to and arising out of employment, even though such injury was due entirely to the negligence of the employee.

Similarly, occupational disease compensation laws, if and when adopted, will tend toward making the employer an insurer of the employee's general health.

Such laws will force the employer to set up machinery whereby he may defend himself against false and unjust claims, as it is at present necessary to defend himself against injury claims not arising out of and due to employment. Before occupational disease laws become effective, it is very essential that the mining industry insist on at least two safeguards—first, to guard against accrued liability, and second, to make certain that compensation shall be payable only for diseases that are truly occupational. To carry out these safeguards, it will be imperative to have pre-employment physical examination, and the right to insist upon physical examination at designated periods during employment. Such physical examinations will naturally reveal the other hazards to health, especially those which contribute directly or indirectly to the occupational disease in question.

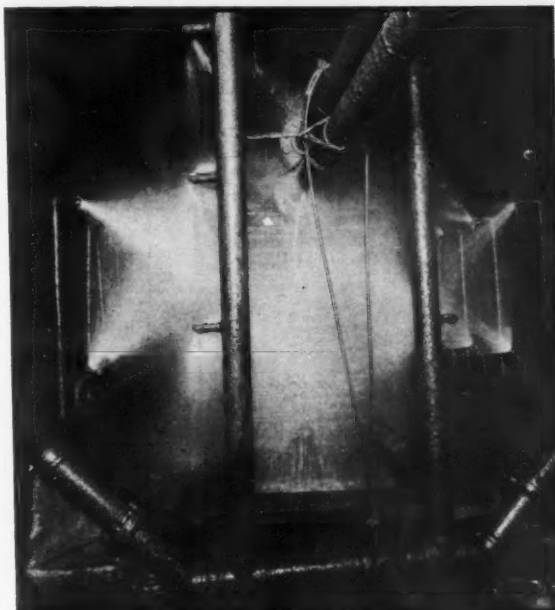
However, this is not a paper on occupational disease legislation, and moreover, legislation will not solve the question of such diseases.

The metal mining industry is fortunate by comparison with some other industries, in that it has but one important occupational disease, namely, silicosis.



"Laird" compressed air-water atomizing spray—for moistening shaft timber—installed in top of shaft opening

Anaconda has pioneered in air-conditioning mines in the U. S.—an important factor in making for healthier conditions for the miner. Shown is the spray chamber for dust elimination at the 3600 level air-conditioning unit at the Mountain Con mine



The silica dust problem has been peculiar to metal mining and its allied industries of stone dressing, etc., since earliest history, and the disease known as silicosis has taken a heavy toll in both lives and money. It has been only comparatively recently, however, that mining men and scientists have attacked the problem with a view to reaching a solution.

Silicosis Conferences of U. S. Department of Labor

After several years of somewhat uncoordinated effort on the part of mining men, medical men, and engineers, the United States Department of Labor recognized the effort on February 26, 1936, by calling into conference a group representing industry, labor leaders, representatives of the medical and legal professions, as well as insurance carriers and state administrators. It was the opinion of this group that much could be accomplished through a pooling of existing knowledge concerning silicosis, the evaluation of this factual matter, and its dissemination. Accordingly, a larger and more representative group met with the Secretary of Labor on April 14, 1936. At this conference four committees were organized, as follows:

1. Committee on the Prevention of Silicosis Through Medical Control.
2. Committee on the Prevention of Silicosis Through Engineering Control.

3. Committee on the Economic, Legal, and Insurance Phases of the Silicosis Problem.

4. Committee on the Regulatory and Administrative Phases of the Silicosis Problem.

After a period of nine months, during which numerous meetings were held by the various committees, another conference was held on February 3, 1937, at which these different committees presented their reports. Shortly after this conference, the Department of Labor published Bulletin No. 13 of the Division of Labor Standards, giving a summary of the reports of the four committees referred to above, together with an abstract version containing the principal findings and recommendations, written in non-technical language. In this bulletin I find very interesting statistics pertaining to the prevalence of silicosis, as follows:

How many workers have silicosis?

No one knows exactly how many workers have silicosis. Most of the surveys made in this or in any other country have been confined to the mining industry. From these reports, however, and from other available data, a number of estimates have been advanced on which there is rather general agreement. It is estimated that of the 49,000,000 workers in the United States, only 1,000,000 (2 percent) are in any way exposed to the hazard of silicosis. Perhaps half of this number, 500,000 (1 percent of the total), are exposed to a serious hazard. Approximately 110,000 (two-tenths of 1 percent of the total) have silicosis in some degree, but it is likely that the number of workers who suffer any work disablement at this time from this disease is of



Discharge nozzle in ventilation tube is designed to discharge air in flat tabular stream, striking against the back near the face of the drift, and not on the bodies of men at work

the order of 4,000 to 5,000 (a fraction of 1 percent). This calculation is based upon medical examination of men actually at work and does not include those already permanently detached from their employment by reason of disabling silicosis.

From a purely statistical point of view, therefore, the problem of silicosis is not as serious or general as some other industrial problems, such as lead poisoning and industrial accidents.

What is silicosis?

In the language of the layman, silicosis is a disease of the lungs in which the normal lung tissue is replaced by fibrous or scar tissue due to breathing air containing silica dust.

Can silicosis be prevented?

The answer of the best authorities is that there is no known cure for silicosis, but there no longer is any doubt that silicosis can be prevented.

Effect of Protector Dusts

There is a considerable school of thought, both in Canada and the United States, that holds that silica dust becomes harmless by the introduction of protector dusts, such as finely divided metallic aluminum. In an article published in the *National Safety News* of April, 1938, Dr. L. U. Gardner, of the Saranac Laboratory, names a number of dusts which seem to have the effect of rendering silica insoluble, and therefore nontoxic, in the lungs of guinea pigs. He mentions high concentrations of quartz dust mixed with dusts of gypsum, hematite, and calcium flouride. Also, there is evidence that the various silicates which are mixed with quartz of gran-

ite have the effect of greatly delaying the toxic effect of the silica.

That there is a probability of some influencing condition in connection with these protectors is shown by the fact that thousands of farmers are exposed for certain periods of the year to much higher concentrations of silica dust than are to be found in any of our mines, and do not contract silicosis. The dust of the field is mixed with a great many of the so-called protector dusts, such as gypsum, alumina, and calcium.

Dr. Gardner intimates, however, that the protector action may be in the nature of a retardant, rather than an inhibitor, and he states that not enough is known about the action of these dusts to warrant the recommendation that they may be employed to prevent silicosis in industry.

Preventive Measures Essential

I know you will agree with me that preventive measures are far more essential, and more satisfactory to all concerned, than compensating for the disease after it becomes disabling. Starting with this premise, it is the duty and obligation of the mining industry to do its part in keeping this dreaded disease to the minimum.

How can silicosis be prevented?

Dan Harrington, of the U. S. Bureau of Mines, in I-C No. 6867, covers it in comparatively few words. This paper is entitled "Silicosis as Affecting Workmen and Operations."

"STOP THE DUST" should be not only the slogan but also one of the major health and safety efforts of mining employers and employees, including those engaged in working in all kinds of dry mines. Ventilation is one of the most effective alleviating agencies, and the use of water is a close second. Certain types of up-to-date equipment serve as very important adjuncts in the reduction of dustiness of air breathed by workers, but devices or equipment which are effective for one industry may be dangerously inefficient in others; some types of respirators may be used to advantage under what might be termed desperate conditions, but they are by no means "cure-alls" for the avoidance of disease from dust.

Under what conditions is dust hazardous?

In answer to this question, I will quote again from Bulletin No. 13, published by the United States Department of Labor:

It should not be assumed, however, that all establishments in these industries are hazardous. To tell whether or not a certain operation is hazardous, it is necessary to determine at least three things:

1. The concentration of dust in the air—number of dust particles per cubic foot of air.

2. The chemical composition of the dust—percentage of free silica.

3. The size of the silica dust particles—measured in microns. (A micron is 1/25,000 of an inch.)

But even when these determinations are made, it frequently is difficult to say that one operation is hazardous or that another is not hazardous. While it has been proven that particles larger than 10 microns in their greatest dimension are not hazardous, the factors of safety with respect to concentration and composition are not so definite. In general, dust concentrations of less than 5,000,000 particles per cubic foot of air are considered safe even in cases where the dust contains a high percentage of free silica. To obtain a more definite correlation of these two factors, it has been suggested that the dust count be multiplied by the percentage concentration; then if the result is under 5,000,000, one can be almost sure that the conditions are safe. But, unfortunately, the reverse is not so definite; if the result is more than 5,000,000, one cannot say with assurance that the conditions are unsafe.

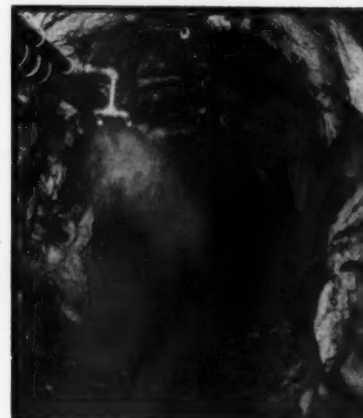
For example, 10 percent (of free silica) times 50,000,000 (particles per cubic foot of air) equals 5,000,000—safe.

But 30 percent times a concentration of 30,000,000 is 9,000,000—perhaps not as safe as the preceding example, but present knowledge does not warrant a statement branding this unqualifiedly as a hazardous condition.

These figures are in complete accord with such authorities as Dr. A. J. Lanza, assistant medical director, Metropolitan Life Insurance Company, New York City; Dr. R. R. Sayers, medical officer in charge, United States Public Health Service, Washington, D. C.; Dr. L. U. Gardner, of the Saranac Laboratory; and others.

Dust Control Campaign Started in 1918

The management of the Anaconda Copper Mining Company is in complete accord with Dan Harrington, of the Bureau of Mines, in his slogan, "Stop the Dust." The Anaconda Com-



Two atomizing water sprays for humidifying air in main air course

pany started its campaign of dust control in 1918 by the adoption of wet drilling methods, and we later found that in our Butte operations proper ventilation was very essential.

The policy of the Anaconda Company in its control of the dust hazard has always been to improve conditions by proper ventilation and the use of water for sprinkling, and by the adoption of any other methods that have been tried and found practical, thus eliminating the use of helmets, masks, and other gadgets. Respirators are used only occasionally and in very few places.

Dust Elimination Practices Outlined

In our program for eliminating dust in the air passageways and working places in the mines, many regulations have been adopted as standard practice, among which are the following:

Around the collars of the operating shafts and main intake air courses the roads and yards are oiled.

Water sprays and compressed air-water blasts are installed in the operating shafts at different levels.

Water sprays with remote control are provided at skip loading chutes, and station tenders are provided with respirators, although ordinarily no high dust concentrations occur during loading operations as the ore has been previously wet down in the mine.

Shaft stations must be kept clean at all times.

All main haulage ways and inlet air courses are periodically wet down, different methods being in use. In some cases large circular tanks are used; in others, permanently fixed sprays, and on some levels a hose is carried by a man whose sole duty is to wet down certain areas.

Tops of all raises in active zones are provided with sprinkling hose.

A general rule is made requiring the wetting down of working places at the start of the shift, and special sprinkling hose are provided for this purpose.

All dead-end places are equipped with a blower and flexible tubing for auxiliary ventilation.

In raises, special precautions have been found necessary. Chute sides next to the manway are solidly lagged or bricked. Space bricking next to the manway has been eliminated, and an individual blower, with flexible tubing, is installed for each raise.

It has been found that dust disseminated in the air during drilling might be greatly reduced by increasing

DATA ON AIR CONDITION IN BUTTE MINES OF ANACONDA COPPER MINING COMPANY

Atmospheric environment	(Men in atmosphere) Number	Percent	Average daily dust concentration, millions of particles per cubic foot
General mine air.....	1,208	42.42	2.1
Air of stopes.....	793	27.84	1.8
Air of working faces on levels.....	383	13.45	1.4
Air of raises.....	203	7.13	4.2
Air of shaft stations.....	127	4.46	1.8
Air of intake shafts and skip-loading stations.....	75	2.63	3.1
Air of intake shafts.....	59	2.07	0.7
Total.....	2,848	100.00	

the quantity of water forced through the drill steel.

Blasting during the shift is reduced to the minimum and compressed air-water blasts are used in all sill and raise work after blasting.

Detailed Survey Made

The Anaconda Copper Mining Company has always cooperated to the fullest extent with the United States Bureau of Mines, and the assistance from the Bureau has been very helpful. Accordingly, in 1935, an invitation was extended to the Bureau to make an examination of the existing conditions in our Butte mines. This survey was made by Dr. Carlton E. Brown, chemist, Gas Section, Pittsburgh Experiment Station of the Bureau, assisted by our Ventilation Department. The results of this examination check very closely with conditions as previously determined by our ventilation engineers. The Bureau report, which has been recently released, shows the data included in the accompanying table.

While the total silica content of the rock in the Butte district often runs as high as 60 percent, the free silica content ranges from 10 to 20 percent for the reason that much of the total silica is present in combined form in silicates, such as feldspars and micas.

The free silica content of the dust is less than the content of the unbroken rock because the quartz, being harder than the feldspar, breaks less readily into smaller particles. Cor-

relating the two factors by multiplying the silica concentration of the dust particles per cubic foot, as suggested in Bulletin No. 13 mentioned above, in the raises which show the highest count of 4,200,000, times 20 percent free silica, we get 840,000, which is far below the safe limit which all authorities agree will produce silicosis to a disabling degree.

Physical Examinations Would Be Helpful

We have not as yet adopted pre-employment physical examination, and we have no age limit as to employment. There is no doubt that pre-employment and periodical physical examination would be of great assistance in health conservation.

In my opinion, the question of health conservation of the metal miner is a job for the mine operator and engineer. The scope of the medical profession for the most part in such work is in assisting by physical examinations and medical research.

It is a duty of mine operators, and in the long run will react to their own advantage, to exert every effort to obtain the best practical working conditions. This can be accomplished by having a proper survey made as to existing conditions by engineers who are familiar with and competent to carry out the best practices in dust determinations, and to recommend methods and practices to improve conditions that are both practical and economical under various mining operations.

New Mexico Miners Organize

With 102 mining men interested in the welfare of the industry in New Mexico present, the initial convention of the New Mexico Miners and Prospectors Association was held January 28 at Albuquerque, N. Mex. T. B. Benjovsky, of Silver City, who has been serving as temporary president of the association, was elected to that office. Other officers elected include:

J. B. Carman, Questa, vice president; R. M. Twiss, Vanadium, secretary; and Frank Light, Silver City, treasurer.

The association passed eight resolutions which dealt principally with legislation affecting the mining industry in New Mexico, one of the most important of which expressed opposition to wage and hour legislation or any legislation looking to the establishment of a Labor Relations Board in the state.



WHEELS of Government

• *As Viewed by A. W. Dickinson of
the American Mining Congress*

THROUGH the month of March with the President away in the early weeks and with the soothing speeches of Secretary Morgenthau and new Commerce Secretary Harry Hopkins aiding in bringing peace among the embattled Senators on Capitol Hill, the two Houses of Congress settled down to work, and pushed on rapidly with the handling of the Departmental Supply Bills, the Defense Measure and even with the administration Reorganization Bill. It will be remembered that reorganization, together with the struggle over the Supreme Court issue, brought about the two major administration defeats in the last Congress. In the present session the Reorganization Bill which will soon be approved by the President is devised to make Presidential Reorganization orders become effective within 60 days after they are issued unless both Houses of Congress pass a resolution against the administrative order.

Taxation

There have been so many press interviews and statements on tax policies issued from various sources in the administration and at the Capitol in the past 30 days that it is difficult to tell what is coming. Much of the discussion has centered around the removal of the so-called business deterrents, and the Treasury is understood to have a large number of recommendations prepared for submission to the House Committee on Ways and Means if and when the order is given to go ahead. It is now understood that the Treasury statement in whatever form it may take, will be presented to the Committee on about April 15. The President has stated that the net revenue yield to the Government must not be decreased, and it is apparent

that the agricultural group are preparing to force heavy additional expenditures. Senator Pat Harrison, Chairman of the Senate Finance Committee, recently made public information which he had received from the Treasury indicating that if the undistributed profits, capital stock and excess profits taxes should be removed it would be necessary to establish a flat corporation income tax rate of 22 percent on corporations with income above \$25,000 on which the present rates vary from 16½ percent to 19 percent.

Monetary

While hearings were proceeding before the Committee on Banking and Currency of the Senate and the Committee on Coinage, Weights and Measures of the House on bills to continue the powers of the President to utilize the \$2,000,000,000 stabilization fund and to extend the powers to fix the weight of the dollar, Senator King of Utah and Representative Case of South Dakota introduced companion bills to restore the right of private ownership of gold and to authorize the Treasury to pay for new gold in gold coin or gold certificates. The King-Case Bill would permit the Treasury to stop adding to the \$15,000,000,000 gold reserve and, by again placing gold coin and certificates in the hands of the people, would assist in counteracting the dangerous tendency of large masses of people throughout the world to accept without protest "managed currencies" which are now in use.

On March 21 and 23 Federal Reserve Board Chairman Marriner Eccles appeared before the Senate Special Silver Committee, and, in response to questioning after his general presentation, made the statement that there is no reason why gold coin and gold cer-

tificates should not circulate freely in this country at this time. Mr. Eccles's statement was made, of course, with the full knowledge that gold and gold certificates cannot be held under existing laws, but his comment, was frank and interesting.

National Labor Relations Act

On March 27 the Senate Committee on Education and Labor set hearings on the proposed amendment to the Wagner Act to begin on Tuesday, April 11. This will bring up for testimony and ultimate action the amendments proposed not only by Senator Walsh of Massachusetts for the American Federation of Labor but also those proposed by Senator Burke of Nebraska in direct line with the views expressed in the latter Senator's address to the Metal Mining Convention at Los Angeles, October 27, 1938. Senator Wagner of New York, the original sponsor of the National Labor Relations Act, will appear first before the Senate Committee on Education and Labor, and will be followed by representatives of the National Labor Relations Board and other departmental witnesses. Senators Walsh and Burke and the industrial advocates of amending the present act will appear later in the hearings.

Wage-Hour

In recent weeks there have been a number of conferences between the House Labor Committees and Administrator Andrews and Secretary of Labor Frances Perkins. It is understood to be the desire of the Department of Labor and the Wage-Hour Division to accomplish certain administrative amendments to the existing "Fair Labor Standards Act of 1938,"

and it is also known that the Labor Department, the Committee and other sponsors of the act are fearful of opening the act to amendment because of what they consider to be the danger of "weakening" its present structure.

Strategic Minerals

The two bills by Senator Elbert Thomas of Utah and Representative Faddis of Pennsylvania are now on the Senate and House calendars. Both provide for the expenditure of \$100,000,000 over the next four year period for acquisition of strategic materials, with the additional provision for an annual appropriation of \$500,000 for each of four years to permit of a program of exploration, development and beneficiation of low-grade ores by the United States Bureau of Mines and the U. S. Geological Survey. It is known that the President has objected to the expenditure of more than \$10,000,000 in the coming year for the purchase of such materials, and to meet this objection the Faddis bill would permit purchases from debtor countries to be credited against their debts, and would also permit the exchange of surplus agricultural commodities of this country for strategic materials furnished from abroad.

Stream Pollution

After the conclusion early in March of the hearings on Stream Pollution bills before the Committee on Rivers and Harbors of the House a situation arose in the Senate which confused the handling of Senator Barkley's bill. This is the Barkley-Spence bill similar to the Vinson measure of last year which was vetoed by the President. Senator Clark of Missouri objected to consideration of the Barkley bill on the Senate floor and asked that his bill, which he stated is, in effect, the Lonergan bill of previous years, be accorded hearings before the Senate Commerce Committee. The hearings were held late in March, and the Committee now has the Clark bill under consideration. There is still danger that the Clark bill may be attached as an amendment to the Vinson bill on the floor of the Senate and go to conference in that shape, thus reproducing the difficult situation experienced in 1937.

SEC

On March 8 a special informal committee of Western Congressmen under the chairmanship of

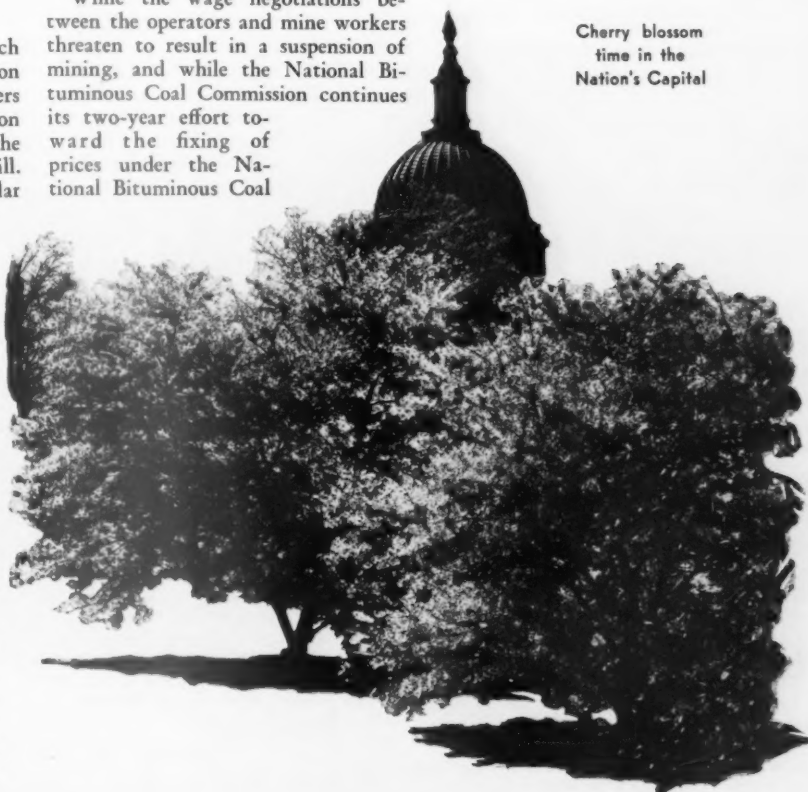
Representative Compton White of Idaho discussed with Chairman William O. Douglas of the Securities and Exchange Commission the desirability of establishing a Mining Registration Division to handle the registration of mining securities in the SEC. Other members of this Committee were Congressmen J. G. Scrugham, of Nevada; Lawrence Lewis, of Colorado; John R. Murdock, of Arizona; and Francis H. Case, of South Dakota. President Howard I. Young, of the American Mining Congress, and Chairman Samuel H. Dolbear, of the American Mining Congress Committee for Cooperation with the Securities and Exchange Commission, presented the views of the organization as indicated in the Declarations of Policy of the Metal Mining Convention at Los Angeles, October, 1938, and of the Annual Meeting of the American Mining Congress in Washington on January 27, 1939. Chairman Douglas expressed his desire to simplify and expedite the handling of mining security registrations, and it is understood that the administrative staff of the Securities and Exchange Commission is endeavoring to work out the details of a Mining Registration Division or Unit.

Bituminous Coal

While the wage negotiations between the operators and mine workers threaten to result in a suspension of mining, and while the National Bituminous Coal Commission continues its two-year effort toward the fixing of prices under the National Bituminous Coal

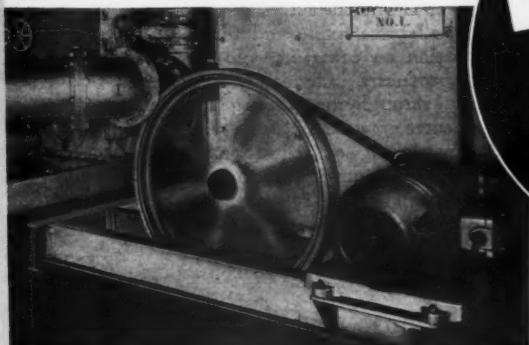
Act of 1937 (Guffey Act), Representative Robert G. Allen, of Greensburg, Pa., has introduced H. R. 5119 to amend the act. The bill eliminates all price fixing and the 30-day limitation on contracts, and provides that producers, individually or collectively through marketing agencies, may enter agreements "with respect to the marketing or regulation of the supply of bituminous coal in interstate commerce." It permits agreements in writing, approved by the Commission, among different districts. The public is protected by continuing the office of Consumers Counsel, and the research activities of the Commission and its authority to appear before the ICC on rate matters are retained. Also retained is the provision for the collection of statistical data with respect to production, distribution and realization of bituminous coal. The collective bargaining feature for labor is retained, as well as the prohibition against the purchase of coal by any government agency from any producer found to be violating the collective bargaining provisions.

Cherry blossom
time in the
Nation's Capital

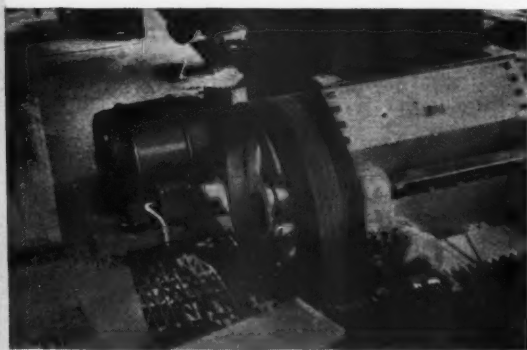


A G-E Mining Specialist Sends in

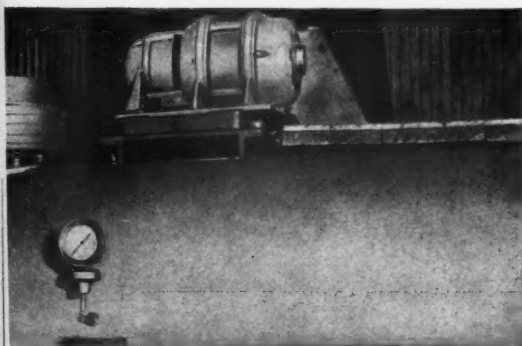
Throughout the country General Electric leads in preparation plant electrification



G-E totally enclosed, fan-cooled motor driving jig mill



G-E 15-hp splashproof motor driving crusher



G-E 7½-hp gear-motor driving automatic coal washer



Distribution panel equipped with G-E CR7008 switches and Type AF-1 circuit breakers

10 TIMELY TIPS

on Electrifying Preparation Plants

FRED RICHART, the G-E engineer who serves the Southern Illinois coal fields, has helped in the selection and application of electric equipment for some of the country's largest, most modern washeries and preparation plants. His wide experience and his intimate acquaintance with the electrical requirements of the mining industry are two big reasons why a majority of the plants in his territory are G-E equipped.

Fred recently prepared a writeup on the application and performance of G-E equipment in these plants. Some of his observations are given here. We think you'll find that they are really ten timely tips on electrifying preparation plants generally—to be considered in connection with your own requirements:

1. G-E open, general-purpose induction motors meet the majority of motor-application requirements. They are simple in design and strongly built and can be furnished in a wide range of mechanical and electrical modifications.
2. Our totally enclosed, fan-cooled motors are being increasingly favored for operation under severe dust conditions. One company has used them for 12 years and has found them extremely dependable and economical.
3. Several companies have found our splashproof motors highly suitable for locations where protection against splashing or dripping water is desirable.
4. There are a number of G-E gear-motors in service driving conveyors and wash boxes. The amount of hard usage the gears will stand and still operate is almost unbelievable.
5. G-E ball-bearing motors are favored for such tough jobs as driving high-speed vibrating screens. Not a ball-bearing failure has been reported from such applications.
6. Our combination switches (Type CR7008) have been installed by several companies. About 150 of them—with a three-pole air circuit breaker instead of fuses—have been in service for more than two years, and we've had nothing but praise for their performance.
7. When G-E magnetic control, such as that just mentioned, is enclosed in dustproof or weatherproof cases, maintenance is markedly reduced because of the protection thus afforded against dust and moisture.
8. We have shown a number of companies how they could reduce power costs by installing equipment with power-factor-improvement characteristics.
9. G-E pellet-type lightning arresters are providing effective lightning protection for substations and other transformer installations in the 2300/4000-volt class throughout this territory.
10. The G-E 6X242 enclosed porcelain primary cutout has proved to be a highly satisfactory device for short-circuit protection of transformer substations.

See our exhibit at the American Mining Congress in Cincinnati, April 24-28.
Booths 417-423. General Electric, Schenectady, N. Y.

GENERAL  ELECTRIC



NEWS and VIEWS

Anthracite Wage Negotiations

It was announced in mid-March that a meeting of anthracite coal operators would be called shortly to consider the basis of a new agreement with the United Mine Workers of America to replace the present one, which expires on April 30, 1939. A demand for a wage cut will be discussed.

Although reports state that a 15 percent cut will be asked, other sources indicate that no specific figure has as yet been discussed, and that a larger cut is needed to place the anthracite industry in a position to compete profitably with other fuels and regain lost markets.

A convention of the UMW was scheduled to be held in New York on March 31 to determine a basis for negotiating the new agreement. It was expected that the union officials would request a meeting with the operators early in April, by which time it thought a new agreement will have been concluded between bituminous operators and miners.

The present anthracite agreement was made in May, 1936, for a 2-year term, but it was extended by mutual agreement last year for another year. Under this agreement, the 8-hour day was changed to seven hours effective May 1, 1937, with day wages remaining the same, thus adding materially to production costs.

Eastern Cost Hearing Postponed By Commission

The hearing on eastern district costs before the National Bituminous Coal Commission which began in Washington March 6 was adjourned two days later until March 27, following protest by Herbert J. Jacobi, representing Carter Coal Company, that it had not been plainly announced by the Commission as a final hearing on costs.

Although some of the commissioners thought the position could be sustained that this hearing was a final cost hearing, despite the language of the official notice in which the words "final hearing" had been omitted, Chairman Tetlow chose not to take any chances on the possibility of court reversal on account of the Commission's steps with reference to this hearing. He therefore announced at the time the meeting was adjourned that in the final hearing on costs, full opportunity would be given interested parties to introduce evidence, cross-examine witnesses, submit motions to

strike out testimony, and submit objections and exceptions to Commission rulings.

It is understood that decision has been reached by the Commission that its cost findings must precede its findings on coordination of prices and marketing rules and regulations. This may further delay establishment of minimum prices. A public hearing is planned on coordination before the coordination findings are drawn up.

In connection with the recent decision of the U. S. Court of Appeals for the District of Columbia upholding the National Bituminous Coal Commission's price-fixing powers and denying the City of Atlanta, Ga., an injunction which would have restrained the Commission from promulgating price-fixing orders for the sale of bituminous coal, it is understood that an appeal will be taken as soon as possible direct to the U. S. Supreme Court on the constitutional question whether bituminous coal prices generally can be fixed by government, and particularly whether prices can be fixed on coal bought by a municipality. Charles S. Ryne, attorney for the City of Atlanta, has advised that his appeal will be taken from the 3-judge court decision, but desires that the appeal go up in the best form to settle the constitutional question involved. Therefore, he has requested the Federal District Court in the District of Columbia to grant a new trial and rehearing of the case. The motion is being opposed by General Counsel Robert W. Knox, of the National Bituminous Coal Commission.

Anaconda Resumes At Orphan Girl

Anaconda Copper Mining Company reopened its Orphan Girl mine in the west portion of Butte early in March, giving employment to about 350 men. This is one of the largest zinc mines in the western United States. At the same time the company reopened its zinc concentrating units at the Washoe smelter and will accept custom zinc ores from other producers.

It also was reported that Butte Copper and Zinc Company has opened up a rich zinc-silver ore body on its 2,100-ft. level, the deepest in the mine.

The Leonard copper plant at Butte, an Anaconda property, was closed early in March. This mine is one of Anaconda's most important properties. It is unofficially estimated that production was reduced about 2,000 tons monthly by the closing of this mine.

Commercial Silver Use Gains

A sharp increase in the use of silver for commercial purposes so far in 1939 has been reported as a result of general business improvement. Steady gains are reported in both straight industrial consumption and in flat and hollow ware for the arts.

Industrial use has been spurred particularly by the increasing orders which are being received by the electrical equipment companies. Silver is superior to copper as an electrical conductor and is used in fine equipment where the higher cost of the white metal as compared with the cost of the equipment is not a decisive factor. Orders of various forms of silver from these quarters are running anywhere up to 50 percent above the corresponding period a year ago, according to best estimates.

In addition, there is a similar gain in the demand for various forms of silver alloys used in silver solders, brazing materials, etc., for use in high-grade equipment which requires exceptional quality of soldering materials.

Harbor Improvement to Benefit New York Iron Ores

Plans for revival of the iron ore industry in New York State were disclosed recently in the record of hearings by army engineers and a congressional committee on a proposed harbor improvement at Oswego, N. Y., Lake Ontario terminus of the State Barge Canal.

Representative Culkin (Rep., New York) told the House Rivers and Harbors Committee improvement of the harbor would facilitate movement of iron ore mined in the Lake Champlain area of New York through the Barge Canal and westward to steel plants at Buffalo, Cleveland and other Great Lakes points.

Mr. Culkin said some steel manufacturers have discovered the deposits still existing around Ticonderoga, Essex County, are of high quality and are planning to move 400,000 tons annually through the Barge Canal to mills in Buffalo, Cleveland and other Ohio cities.

Donald B. Gillies, vice president of the Republic Steel Company, told army engineers at a hearing at Oswego that deepening of the harbor there would "make it possible to ship iron ore from New York State to Cleveland and Buffalo and other lake ports, which it now is impossible to do on account of the lack of harbors that

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Easton, Md. Cleveland, O.
Tampa, Fla. San Francisco, Cal.
Memphis, Tenn. Los Angeles, Cal.

will care for lake vessels of sufficient
tonnage to make it profitable."

The House committee approved the
project for deepening the west harbor
at Oswego.

**Mammoth-St. Anthony Takes Over
Molybdenum Gold**

Mammoth-St. Anthony, Ltd., has
taken over operation of the Mohawk
and New Year mine of Molybdenum
Gold Mining Company at Mammoth,
Ariz., according to a report from Fos-
ter F. Naething, general manager of
the Mammoth-St. Anthony Company.
Molybdenum Gold has been treating
ore from both properties at its 300-ton
mill. About 260 men are employed by
Mammoth-St. Anthony, and the com-
pany is treating about 550 tons per
day.

**Canada Makes Record Copper
Output**

Canada's production of copper
established a new high in 1938 with
an output of 585,522,000 pounds of the
metal, which compares with 530,029,-
000 pounds in 1937, according to a
Canadian Resources Bulletin. Owing
to the lower price of copper, however,
the value of the production in 1938,
which amounted to \$57,876,000, was 16
percent below that of 1937.

Leading copper producing province
of the Dominion is Ontario, the source
of its output being the copper-nickel
ores of the Sudbury district. No-
randa is the outstanding producer
in Quebec, other important contribu-
tors to the output in the same district
being Aldermac, Waite-Amulet and
Normetal mines. At Eustis, Que.,
Canada's oldest copper mine was op-
erated continuously during the year
by the Consolidated Copper and Sul-
phur Company, Ltd.

As a result of careful geological
study and a program of diamond drill-
ing, a deposit reported to contain up-
ward of three and a quarter million
tons of copper-zinc ore was disclosed
at the Waite-Amulet property. The
ore occurs at a depth of about 1,000
feet below the surface. Copper con-
centrates from the Waite-Amulet and
Normetal mines are being smelted at
Noranda, while those from Aldermac
and Consolidated Copper and Sulphur
Company are being exported. A plant
is now being erected at Aldermac to
produce elemental sulphur from pyri-
tic concentrates, from which a pure
iron oxide will be obtained as a by-
product.

New Mine Opened in Joplin

A new mine, characterized as one
of the richest zinc mines ever opened
within the city limits of Joplin, Mo.,
is being developed by the Eunamar
Mining Company on the O'Keefe land,
situated near the old Bingo mine, a
good producer many years ago. A

120-ft. shaft was recently completed
by the company, and a drift has been
cut out on the 118-ft. level 35 ft. to
the west and 20 ft. to the northeast
from the shaft into a good ore body.
The face of the ore is 7 ft. in height
and 20 ft. in width, with ore averaging
conservatively 40 percent in sphal-
erite, according to a report by L. E.
Gager, president of the company.

Sunshine Expansion Policy

R. M. Hardy, president of the Sun-
shine Mining Company, has informed
the stockholders that the directors of
the corporation believe that an at-
tempt should be made to diversify and
expand the mining operations of the
company.

"With this objective in view," he
stated, "Sunshine Exploration, Lim-
ited, has been organized under the
laws of Nevada. At the present time
Sunshine Exploration, Ltd., holds an
option on control of the Rio Grande
Copper Company and is financing ex-
ploration work on property of this
company at Mountain City, Nev."

Mr. Hardy also officially informed
the stockholders that an option has
been taken on a majority of the stock
of Silver Syndicate, Inc., whose prop-
erty adjoins on the north. This will
permit greater freedom in prospect-
ing the northern part of the property.
Under this option, Silver Syndicate,
Inc., will pay in Silver Syndicate stock
for any development work done for
its benefit.

Tennessee Mine Closes

The famous Tennessee mine of the
Tennessee-Schuykill Corporation, in
the Wallapai district near Chloride,
Ariz., was recently closed on orders
received from the home office in New
York City.

A small staff of men will be kept on
to remove pumps from the lower
levels, and water will be kept out of
the workings by bailing. Should lead
and zinc prices rise sufficiently, the
mine will be reopened. Jacob Schoder
has been general manager of the Ten-
nessee-Schuykill Company for the
past three years, with Richard D'Arcy
mine superintendent.

**Wyoming Coal Mines to Continue
Work**

No cessation of work will take place
in the Wyoming mines of District 22,
United Mine Workers of America,
after the present wage contract ex-
pires on April 1, according to Albert
Roberts, district vice president.
Roberts stated early in March that at
a conference of operators and union
officials held in Cheyenne March 3, an
agreement was reached that provides
for continuation of work in the Wyom-
ing mines on and after April 1, 1939,
pending formulation of a new wage
agreement.

MUCKING TIME REDUCED $\frac{2}{3}$

By the Extra Speed and Power of Gardner-Denver Mine Car Loaders

● In a western copper mine, five Gardner-Denver GD-9 Mine Car Loaders have reduced mucking time 66 $\frac{2}{3}$ %. In other words, the Gardner-Denver Loaders completed in ONE hour the same amount of mucking that formerly took THREE hours with hand methods!

The photograph shows one of the GD-9 Loaders working on a 9 $\frac{1}{2}$ x 11 foot drift, which is being advanced from 6 to 7 feet per day. Each round consists of the loading of 18 to 20 cars of approximately 4 tons capacity. Time for mucking averages about 5 minutes per car. Maintenance of the loader, of course, is extremely low, according to the records that have been kept at the mine.

It takes loaders with SPEED and POWER to get results like this—and Gardner-Denver Loaders have what it takes! Powered by two radial air motors of adequate power, each of these loaders has the reserve capacity for heaviest mucking... the power to stay on the job, even when air pressure drops. Get the whole story of Gardner-Denver Mine Car Loaders—and why they give you more for your investment. Write today for illustrated bulletin! Gardner-Denver Company, Quincy, Ill.

"Very well pleased
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Here's a typical service
report on a Gardner-
Denver Mine Car Loader
installed in a Quebec
mine! "Second Gardner-
Denver loader just re-
cently put into service.
Superintendent very
well pleased when crew
drilled two rounds (6-
foot round in 8 x 9 drift)
in single 8-hour shift."



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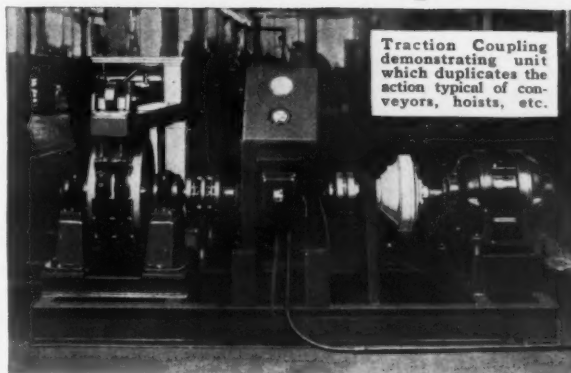
APRIL, 1939

SEE THE ACTION



OF THE *Fluid Drive* (HYDRAULIC COUPLING)

at the 16th Annual Coal Convention and Exposition



Traction Coupling
demonstrating unit
which duplicates the
action typical of con-
veyors, hoists, etc.



Impeller and Runner

USES:

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Crushers, Shaker
Screens, Pumps,
Hoists, Locomo-
tives, Excavating
Equipment, etc.

Mining men and their friends are invited to see the Fluid Drive (traction type Hydraulic Coupling) in action at Cincinnati, April 24-28. This new Fluid Drive has no mechanical connection between driving and driven halves, and offers many advantages. Power is transmitted by the kinetic energy of the fluid (usually light turbine oil) which circulates automatically by centrifugal action between the radial passages formed by vanes in the rotating members. Transmission of shocks from the driving motor to the load or from the driven machine to the motor are entirely eliminated. Sudden stalling when overload occurs is taken entirely by the Fluid Drive without damaging the motor. See the exhibit. Bring your problems. Ask questions.

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Santa Fe Gold Buys Property

Santa Fe Gold Mines, Inc., has recently acquired the properties of Arlington Mining Corporation, located in Black Hawk Canyon, 35 miles southeast of Victorville, San Bernardino County, Calif. A 600-ton daily capacity sandleaching cyanide plant is now under construction and extensive road building is in progress. Eighty men are employed.

A 25-ton cyanide plant and an aerial tramway were installed several years ago for preliminary testing of the extensive deposits of shattered gold-bearing limestone beds, which will be mined by both open cut and block caving methods. As the gold is concentrated in the fines, simple screening, after mining, eliminates the coarse low grade material.

The 600-ton treatment plant, to be constructed soon, will indicate the best practice to be used in future larger scale operations which are contemplated.

Santa Fe Gold Mines, Inc., has been privately financed in the East.

Officers of the company are as follows: Harlan H. Bradt, managing engineer; W. Lunsford Long, chairman of the board; Hewitt S. West, president; Roy K. Voorhies, vice president; Daniel Heyward, vice president; Edward H. Emerson, secretary and treasurer; H. V. Dorr, assistant secretary and treasurer; and Grant Holcomb, attorney.

Directors include: Harlan H. Bradt, Hewitt S. West, W. Lunsford Long, Daniel Heyward, W. George Thomas, Roy K. Voorhies and Algernon Del Mar.

Less Metal For Ammunition

Consumption of copper, lead and zinc in ammunition declined rather sharply during 1938, according to reports from manufacturers to the American Bureau of Metal Statistics. The totals given below, however, are exclusive of use by the army and navy for their own manufacture.

Consumption of copper declined to 4,274 tons from 7,002 in 1937, while that of zinc declined to 1,535 tons from 2,337, both being new lows since 1932. Consumption of brass (purchased as such) declined to 485 tons from 769 in 1937 and was the lowest since 1933, when the total was 262 tons. Consumption of lead dropped to 30,112 tons from 37,699 in 1937 and was the lowest for the last six years, with the exception of 1935, when it totaled 28,835 tons.

Montana Mining Discussed in Butte

During the past month a series of seven talks covering Montana's great basic metal mining, smelting and refining industry were presented to the Butte Rotary Club. Subjects and speakers were as follows: "History of Mining in Montana," by Samuel Barker, Jr.; "Ore Deposits in Mon-



Visitors to the United States Steel Corporation exhibit at the Golden Gate International Exposition will see how steel is made in miniature. Henri Marchand and Henri Marchand, Junior, diorama experts, are putting the finishing touches to a scene showing an open-hearth furnace operation in a modern steel mill. The miniature ladles of this small plant actually move, showing how a blast furnace is charged and how molten steel is poured into ingots for further processing.

tana," by M. H. Gidel; "Mining in Butte," by J. J. Carrigan; "Mining in Montana (exclusive of Butte)," by Carl Trauerman; and "Concentration and Smelting of Ores," by Chas. A. Lemmon. Subjects for the last two weekly luncheons were "Refining of Copper and the Manufacture of Copper Rods, Wire and Bare Cable" and "The Production of Zinc," but the names of the speakers had not been announced in advance.

These addresses will later be printed and compiled in booklet form for distribution by the Butte Chamber of Commerce.

New Shaft At East Gulf

Characterized by a mine official as one of the best shafts in West Virginia, a 350-ft. shaft is now being used by the East Gulf mine of the C. H. Mead Coal Company, at Beckley, W. Va. Work of sinking the shaft, completed January 23, took about 12 weeks.

An official of the company described the new shaft in the following words: "It is worthy of note that not only is the performance a record as to speed; it is also the opinion of all who have seen the completed shaft that it is the best in West Virginia from the point of view of alignment, shaft bottom arrangement and finish generally."

The shaft is sunk through alternate layers of sandstone and shale, and is lined with 18 inches of concrete for 36 feet, below which the lining is creosoted.

Anthracite Operations On Three-Day Week

Anthracite's emergency 3-day week, a market stabilizing move, started March 6 with collieries and mine workers idle. While soft coal companies studied a proposal for a 4-day week, the anthracite operators put into effect the new work program they mapped at conferences with Governor James.

The reduction from the normal 5-day week for anthracite is to remain in effect at least through March unless severe winter weather cuts into the supply of coal already mined and strengthens demand. After a month, a committee representing the state, the operators and the miners' union will have power to lengthen the work week to four or five days.

Although the shorter week makes no change in the wage rate, fixed by a contract which expires April 30, earnings of mine workers dropped sharply.

Proponents of the shorter week said slowing up production would avoid a price-cutting war over large stores of anthracite already mined but not marketed.

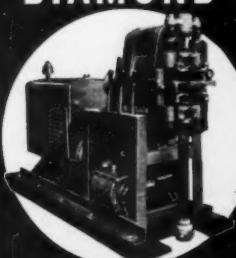
Some mines were in operation the first day under the new schedule. There was no fixed arrangement as to which "three days" collieries would operate. Some operators planned to work every second day to meet the schedule. Others indicated they would work out the first days of each week and remain idle the end of the week. Many favored operating Tuesdays, Wednesdays and Thursdays.

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 Cincinnati, Ohio, April 24-28

This Bore Hole Suspension Unit *will feature the* **Anaconda Exhibit**

MINE operators will find it both interesting and profitable to attend the American Mining Congress Exposition this spring. At this convention it is expected that more new equipment will be displayed than in many years.

The Anaconda Wire & Cable Company will show you the Bore Hole Suspension Unit featured on this page. Anaconda engineers will be on duty at our Booth (No. 822). They will not only demonstrate this Suspension Unit...but other Anaconda developments in mining machine cables.

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Advantages Offered by Anaconda's Bore Hole Suspension Unit

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- 3 Neat and compact.
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to Delegates and Members of

THE AMERICAN MINING CONGRESS

Coal Convention and Exposition

... on behalf of ...

Cincinnati Hotels Association

■ ■ ■ **W**E extend a most cordial welcome to the thousands of coal men and manufacturers who will be in Cincinnati the week of April 24th. We count it a privilege to be your host.

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| • <i>Mariemont Inn</i> | • <i>Kemper Lane</i> |

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CINCINNATI

Move to Amend Guffey Act Progresses

The Committee for Amendment of the Coal Act met in Washington recently to discuss ways and means of carrying on their fight to amend the Guffey Act. It was reported that the amount of tonnage now supporting this movement is increasing daily and that the Committee now has a very large part of the entire bituminous coal industry on record as supporting its drive.

Chairman John A. Howe, in a recent statement, recorded the Committee as heartily endorsing the Allen Bill, H. R. 5119, as the first and most constructive step toward relieving the present intolerable conditions existing under the present Act. At their meeting, members of the Committee ratified the action of Mr. Howe.

The bill was introduced by Representative Robert G. Allen of Pennsylvania and after studying it carefully, Mr. Howe gave it his full approval, asserting that it was the best cure for the present unworkable provisions of the Guffey Act.

Mr. Howe said:

"The Bill introduced in the Congress recently by Mr. Allen of Pennsylvania represents the ideas of the Committee for Amendment of the Coal Act exactly.

"The large and small producers our Committee represents now realize that price-fixing is just as unworkable for the coal industry as it has proven itself to be in other industries where it has been attempted. We also have realized that if the National Bituminous Coal Commission did fix prices, enforced them and they withstood inevitable court actions, such price-fixing would automatically penalize the consumer. 'Fixed prices' which always mean 'increased prices' will result in further loss of ground by the coal industry to competing fuels.

"We endorse the Allen Bill because it does away completely with price-fixing in the industry. We endorse it because it entirely eliminates the 30-day limitation on all contracts for the sale of coal. For two years this has prevented us from giving our customers any assurance of future price stability and on the other hand has turned the soft coal industry into a gigantic auction room.

"We endorse the Allen Bill because it eliminates the taxes and assessments that now burden the industry and raises the consumer's costs.

"Sane and cooperative selling of coal has never been given a fair chance. It has always been hampered by the threat of Federal prosecution under anti-trust laws, the Federal Trade and Robinson-Patman Acts. The Allen Bill will permit the soft coal industry to enter more freely into cooperative marketing agreements with Government supervision for the protection of the consumer. We believe that it will be the greatest boon to the coal industry in 20 years."



AMERICAN ROLLING RING COAL CRUSHERS

Here's what a prominent **ILLINOIS COAL OPERATOR** has to say about **AMERICAN ROLLING RING COAL CRUSHERS . .**

"We are happy to state that the two units we have in service are performing satisfactorily. We have an old American Ring No. 30 which is still in use crushing gob and refuse, a new type A. C. 3-A used for making domestic stoker coal, and also a laboratory crusher."

Coal sizing is becoming more important every day, and in order that coal will burn efficiently and economically, it must be properly sized. American Rolling Ring Crushers are making substantial savings right along in coal mines everywhere, because they reduce, in one operation, run-of-mine or lump coal to proper sizes for domestic and automatic stokers—The Rolling Shredder Rings do it! This principle splits the coal instead of shattering it by impact, assuring uniform size of crushed coal and reducing fines to an absolute minimum. Sturdy construction, simple design, and dependable operation save on power and maintenance and give low-cost-per-ton of finished product.



LABORATORY TYPE RING CRUSHER

Laboratory type: Here is one of the most valuable developments in recent years—a mill that meets every day requirements of the laboratory. It makes possible for the small manufacturer, as well as for the large one, crushing and pulverizing at very small cost, and it occupies no more space than a desk. Installed with motor ready for operation.

Write us regarding your coal sizing problems. Our engineers will be glad to show how and why American Rolling Ring Crushers can help you achieve important savings. Names and addresses of many prominent and satisfied users furnished on request.

AMERICAN PULVERIZER COMPANY 1019 MACKLIND AVENUE
ST. LOUIS, MISSOURI
ORIGINATORS AND MANUFACTURERS OF RING CRUSHERS AND PULVERIZERS

New Member of Coal Division Advisory Council



HARRY M. MOSES, president of the H. C. Frick Coke Co. and the U. S. Coal and Coke Co., has accepted appointment as a member of the Advisory Council of the Coal Division, American Mining Congress. Mr. Moses' broad experience as a coal operator and executive will be of great assistance to the Division in formulating its policies and carrying through its objectives.

Zinc Institute Meeting

The twenty-first annual meeting of the American Zinc Institute will be held at the Hotel Statler, St. Louis, Mo., on Monday and Tuesday, April 17 and 18, according to an announcement made by Ernest V. Gent, secretary of the Institute.

Activities of the Institute during the past year will be reported on Monday, with special emphasis on promotion work done. Washington news, the domestic zinc market and the zinc situation abroad are other important topics that will be reviewed by authorities.

On Tuesday several speakers will be heard on the subject of the market for zinc coated products. The program will also include a number of technical topics of vital interest, with the U. S. Steel Corporation's technicolor movie "Men Make Steel" scheduled to close the afternoon session.

The spring meeting of the Galvanizers Committee, F. G. White, chairman, will be held at the same time and place. On Monday morning the committee will attend the opening session of the Zinc Institute meeting, and will hold a round table conference on Monday afternoon, open only to members of the Galvanizers Committee. The Tuesday sessions will be devoted to various subjects of joint interest to the Galvanizers Committee and the zinc industry.

Entertainment features will include the annual dinner on Monday evening, and an informal smoker and get-together on Tuesday evening.

A special exhibit of galvanized products will be on display during the convention.

Steel Industry Planning Huge Expenditures

The steel industry will spend \$126,000,000 for new construction and equipment in 1939, according to estimates of the American Iron and Steel Institute gathered from reports of 150 companies representing over 90 percent of steel production. This will make nearly \$1,000,000,000 of new construction since 1934.

The current year's budget is the smallest of the five-year-period, however, being about 25 percent less than 1938, when \$165,000,000 was budgeted and \$140,000,000 actually spent. Principal item in the 1939 program is the modernization of existing equipment.

"The Book of the Year"

1939

COAL MINE MECHANIZATION YEARBOOK

CONTAINS ● the complete papers and discussions of the 1939 Coal Convention ● descriptions of all exhibits at the Exposition ● and a full review of the reports of the Coal Division of the American Mining Congress.

Every Coal Mining Man Should Have One

**ORDER YOUR COPY
NOW!**

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Our specialty—Testing bituminous coal lands
Satisfactory cores guaranteed



We Look Into the Earth

By using Diamond Core Drills. We prospect Coal and Mineral Lands in any part of North or South America.

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Pittsburgh, Pa.
Drilling Contractors

Directors chosen earlier in the meeting included the following: Upper Potomac—Mr. Brown, the retiring president; Mr. Crichton; Douglas Gorman, Cumberland Coal Company; and A. B. Stewart, Davis Coal and Coke Company. George's Creek—George D. Campbell, Campbell Coal Company; Mr. Jenkins; B. H. McCrackin, Consolidation Coal Company; and Mr. Stallings.

Members of the association were guests of the Consolidation Coal Company at a luncheon given at the hotel before the meeting.

St. Lawrence Waterway Condemned

"Cutting the social and economic heart out of the Pennsylvania anthracite region," was the characterization applied to one of the effects of the proposed St. Lawrence Waterway Project in a statement recently made by Louis C. Madeira, III, executive director, Anthracite Institute.

"That this plan has ruinous potential implications," said Mr. Madeira, "is evidenced by a letter written recently by Frank Mantz, executive secretary of the Hazleton (Pa.) Chamber of Commerce to Senator James F. Davis (Rep., Pa.). Mr. Mantz said,

in part, 'Nearly 1,500,000 people in the region desire to go on record against the Project. Labor in the mines will be materially affected; unemployment; lowered property values, and a general recession in the social life will occur.'" It is understood that Senator Davis has referred the letter to the Senate Foreign Relations Committee.

Big Sandy-Elkhorn Elects Officers

At the regular monthly meeting of the Big Sandy-Elkhorn Coal Mining Institute, held February 24, the following men were elected as officials of the organization for the coming year: C. L. Spradlin, South-East Coal Co., president; F. M. Correll, Consolidation Coal Co., vice president; B. F. Mason, Paragon Elkhorn Collieries Co., vice president; W. R. Campbell, Koppers Coal Co., vice president; and A. D. Sisk was reelected safety director and secretary-treasurer.

The following directors were also chosen: A. B. Brooke, Elk Horn Coal Corporation; G. C. Sutherland, Inland Steel Company; V. D. Picklesimer, South-East Coal Company; Estill Cox, Elk Horn Coal Corporation; B. H. Purser, Consolidation Coal Company; Herbert Wheeler, North-East Coal Company; R. C. Thomas, North-East Coal Company; M. K. Reed, Sampson Elkhorn Mining Company; J. H. Claggett, Utilities Elkhorn Coal Company; Lawrence Runyon, Central Elkhorn Coal Co.; J. T. Parker, Inland Steel Company; Harvey Maynard, Beaver Coal & Mining Company; Frank Erwin, Consolidation Coal Company; and J. D. Snyder, Consolidation Coal Company.

New Methods of Entry Development

(Continued from page 28)

capacity of the mobile conveyor in the three-section unit of 18 feet is from 5 to 7 tons, depending on coal height. Additional sections can be inserted where practicable and thus increase the capacity of the unit proportionately.

At the loading point, where sufficient thickness of bottom rock has been brushed, the mobile conveyor can discharge direct into the mine car. In our practice, this plan is used as well as the type of installations that require an elevator or cross-conveyor, where conditions lend themselves best for their use.

The mobile conveyor is a simple, self-contained unit that can be extended at will by the simple extension of track. It can be used to drive cross-cuts, room necks, or places in any direction off the air course. Three men ordinarily comprise the crew on the mobile conveyor. Working two shifts, they drive a single air course and cross-cuts in about the same time that a crew of two men, working three shifts, develop the same distance in the entry. Production per man-day averages from 10 to 13 tons, depending on the crews, physical conditions encountered, and the efficiency of the car servicing.

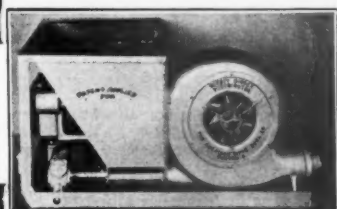
Work of Moving Ahead Simplified

Moving ahead with this type of installation involves only the work of: (1) lifting the back track, which can be loaded directly into the mobile conveyor and stored with a minimum of space requirements at a location convenient to the new set-up, (2) making the necessary track extension through a cross-cut or room neck to the new loading point on the entry, and (3) moving ahead the elevator or cross conveyor where they are used.

Minimizing the time and cost in moving equipment from one set-up to another often represents the factor in determining whether conveyor equipment can be used profitably in this class of work.

Use of the Goodman Entry Loader in the entry and the Mobile Conveyor in air courses has provided a combination of equipment that has made possible a distinct improvement as to speed of development and cost reduction in our development program, and as we continue our use of this equipment we are improving results and broadening its application.

ROCK DUST



MIGHTY MIDGET

has everything

1. Can be transported by belt, car, or carried by 2 men.
2. Distributes 4 tons of dust in 4½ hours, including lost time.
3. Most economical machine for room dusting.
4. The price is RIGHT.
5. Let us run off a free test at your mine.

A good trade-in allowance when you want to buy a larger machine

AMERICAN MINE DOOR CO.
2063 Dueber Ave. • Canton, Ohio

Meeting of Williamson Association

The annual meeting of the Williamson Field Operators Association was held at Williamson, W. Va., March 2, at which all officers of the association were reelected for the coming year. These included: L. E. Wood, president; C. A. Hamill, vice president; J. D. McLaughlin, treasurer; and Joseph J. Ardigo, secretary.

Members of the board of directors are Thomas Pritchard, G. D. Davidson, O. W. Evans, George W. Gehres, W. S. Leckie, Laurence E. Tierney, George W. Craft, J. W. Strickler, W. W. Walker, and E. E. Ritter.

Problems concerning freight rates and marketing conditions were thoroughly discussed, and three resolutions unanimously adopted. One of these urged the Federal Power Commission to exercise its full power under the Gas Act, through regulation of the natural gas industry and elimination of unfair methods of competition; another urged passage of H. R. 12 by both Houses of Congress; and the other opposed the building of the Bluestone, W. Va., hydroelectric project which would result in the displacement of 250,000 tons of coal annually.

Iron Ore Association Meets

At the annual meeting of the Lake Superior Iron Ore Association, held in Cleveland, March 8, 1939, all the directors and officers of the organization were reelected. The directors are: R. C. Allen, Elton Hoyt, 2nd; Geo. M. Humphrey, E. B. Greene, D. B. Gillies, Patrick Butler, C. B. Randall, Wm. P. Snyder, Jr., and M. C. Angloch.

Officers of the association include: R. C. Allen, president; Elton Hoyt, 2nd, vice president; E. B. Greene, vice president; C. N. Hickok, treasurer; and M. D. Harbaugh, vice president and secretary.

Julian D. Conover represented the American Mining Congress at the meeting, and gave a review of matters in Washington of interest to the iron ore industry. At the meeting the association continued its wholehearted support of the Mining Congress for the ensuing year.

—BOOK REVIEWS—

The Stone Industries. By Oliver Bowles. McGraw Hill Book Co., Inc., New York and London. Pp. 519. Price \$5.00.

This, the second edition of the very comprehensive book first published in 1934, brings statistical references up to date, with only minor corrections having been necessary concerning centers of production and technology of quarrying and fabrication.

The 27 years' intimate experience of the author with the stone industries makes this work an authoritative reference on the subject, portraying true conditions of the stone industries as they exist today. The 18 chapters deal comprehensively with the geology, distribution, production, technique of quarrying and fabrication, uses and marketing of the many varieties of dimension stone and crushed stone.

Mineral Valuations of the Future. By C. K. Leith. American Institute of Mining and Metallurgical Engineers, New York. Pp. 116. Price \$1.50 to non-members; \$1.00 to members.

Too often valuation of mining properties includes merely careful estimates of quantities of minerals present and calculation of present value, without careful consideration of economic and political factors, of growing importance, that may seriously affect future production costs and selling prices. Some of these factors, which must be taken into full account in an intelligent mine appraisal, are economic nationalism, nationalization of minerals, conservation measures, taxation, competition and monopoly, slowing acceleration of consumption, and advances in technology.

Addressed particularly to the younger men of the profession, this

Seeley W. Mudd Memorial Fund volume will be found extremely helpful not only to the student but also to the mature economic geologist and mining engineer. Unfortunately, space limitations made it necessary to condense much material almost to bare outline proportions.

PUBLICATIONS of INTEREST U. S. BUREAU OF MINES

I. C. 6999R. LABORATORIES THAT MAKE FIRE ASSAYS, ANALYSES, AND TESTS ON ORES, MINERALS, AND OTHER INORGANIC SUBSTANCES, by C. W. Davis and M. W. von Bernewitz. 27 pp.

I. C. 7043. RECONNAISSANCE OF MINING DISTRICTS IN LANDER COUNTY, NEV., by WILLIAM O. VANDERBURG. Gives the results of a reconnaissance of the mining districts in Lander County, Nev., made from March 29 to April 20 and from May 9 to May 21, 1938, during which virtually all of the mining districts in the county were visited. Report covers the situation of the various districts, types of ore deposits, ownership and description of mines and prospects, information on past and current activity, and other information of economic interest. 83 pp. 1 fig. 7 tables.

I. C. 7044. INSTALLATION OF HIGH-TENSION POWER CIRCUITS IN COAL MINES, by E. J. GLEIM. Describes the methods followed in various sections of the United States when electrical circuits are taken into mines by means of cables suspended in shafts and boreholes. 14 pp. 4 figs.

I. C. 7046. SAFE STORAGE, HANDLING, AND USE OF COMMERCIAL EXPLOSIVES, by Dan Harrington. Discusses the various types of commercial explosives and their safe storage, handling and use in the mines and quarries of the United States. About 70 percent of the explosives used in the United States is consumed by the following industries: About 38 percent coal mines, 19 percent metal mines, and 13 percent in quarries. Types of explosives suitable for underground use, the hazards to health and safety they create and some of the procedures to eliminate these hazards are outlined.

I. C. 7048. COAL MINE EXPLOSIONS AND COAL AND METAL-MINE FIRES IN THE UNITED STATES DURING THE FISCAL YEAR ENDED JUNE 30, 1938, by Dan Harrington and W. J. Fene. A study of contributory causes of a great number of explosions has shown that the factor responsible for most explosions is inadequate or interrupted ventilation. It is obvious that if adequate ventilation is maintained, explosions will be largely eliminated, though ventilation is no cure-all, as very serious disasters can and do occur in well-ventilated mines. 21 pp.

I. C. 7050. MINE SAFETY BOARD DECISION 30 ON MAIN FAN INSTALLATIONS OF COAL MINES. Bureau of Mines safety board recommends that all active underground coal mines, whether working or idle, have one or more fans in continuous operation. The capacity and installation shall be such that the entire mine workings are adequately ventilated at all times. Main fans shall be located on the surface in fireproof housing offset from the line of any mine opening. The housing shall be provided with ample pressure-release doors or other devices easily opened by the force of an explosion. The installation shall permit prompt reversal of air flow. For mines that liberate gas, these fans shall have at least two independent sources of power immediately applicable.

I. C. 7051. FIRST-AID TRAINING AND RESULTS IN LOGAN AND MINGO COUNTIES, W. VA., by H. J. Van Der Veer and Ray Ellis. 9 pp. Result of training all employees of a mine has shown that first-aid training greatly reduces the severity of the average injury and also aids in reducing the frequency rate of accidents. The man who has been trained in first aid is generally a safer person after having received the training because he has been made to visualize serious personal injury and therefore is more careful and takes fewer chances of receiving an injury. Another advantage is that when a man receives injury he knows how to take care of it and does so more readily than before he had the benefit of first-aid training.

R. I. 3415. PROGRESS REPORTS—METALLURGICAL DIVISION. 26. Fixation of Sulphur from Smelter Smoke. Partial Pressures of Sulphur Dioxide over Solutions of Sulphur Dioxide in Mixtures of Water and Various Aliphatic Amines, by A. H. Roberson and G. W. Marks. 45 pp. 9 figs.

R. I. 3431. HOUSE MOVEMENT CAUSED BY GROUND VIBRATIONS, by J. R. Thoenen and S. L. Windes.

MISCELLANEOUS

SPECIALTY TRANSFORMERS STANDARDS. Publication No. 38-52. National Electrical Manufacturers Association, 155 East 44th Street, New York City, December, 1938. New definition of specialty transformer standards is divided into the following five sections: Part I—Doorbell transformer standards; Part II—Signalling transformer standards; Part III—High reactance control transformer standards; Part IV—General-purpose specialty transformer standards; and Part V—Luminous tube transformer standards. Price of the complete set is \$1.10.

OUTLINE OF THE GEOLOGY AND MINERAL RESOURCES OF GOCHLAND COUNTY, VA., by Carl B. Brown. Virginia Geological Survey, Bull. 48. 68 pp. 10 plates. 2 figs.

PIERCE MANAGEMENT

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Anthracite—COAL—Bituminous

A successful background in the practical solution of difficult engineering and management problems.

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Consulting Engineers

ENGINEERING AND ECONOMIC SURVEYS, ANALYSES AND REPORTS ON POWER APPLICATIONS AND POWER COST PROBLEMS OF THE COAL MINING INDUSTRY

Oliver Building Pittsburgh, Pa.

PERSONALS



WILLIAM V. BURLEY, assistant manager and comptroller of the Magnus Metal Division of the National Lead Company, has been named manager, temporarily succeeding the late James A. Caselton.

H. FOSTER BAIN, mining adviser of the Bureau of Mines, Manila, P. I., has been elected to honorary membership of the San Francisco Engineers Club.

A. LEE BARRETT is now maintenance engineer for the Pittsburgh Coal Company. He was formerly electrical engineer for the company.

ROBERT MONTGOMERY has been appointed chief mining engineer for the DeBardeleben Coal Corporation, Birmingham, Ala., replacing E. J. McCROSSIN, JR., resigned. Mr. Montgomery has been engaged in engineering work at various times for the Woodward Iron Company, Corona Coal & Iron Company and Gulf State Steel Company.

JOHN D. SCOTT, formerly Washington representative of the Anthracite Institute, is now manager of sales for Pierce Management, engineering consultants and mine managers, at Scranton, Pa.

CHARLES DORRANCE is now president of the West Virginia Coal & Coke Company, having been elected to this position by directors at their annual meeting on March 16. He took over his new duties on April 1.

Mr. Dorrance was formerly vice president in charge of operations of Consolidation Coal Company. In his new position he succeeds ROBERT W. LEA, who resigned to become vice president of the Johns-Manville Corporation.

Mr. Dorrance is a member of the Advisory Council of the Coal Division, The American Mining Congress.

L. D. MOORE for many years an employe of the Cleveland-Cliffs Iron Company on the Mesabi Range, has been transferred to Ishpeming, Mich., to become assistant to O. D. McCCLURE, in charge of the mechanical Department of the company.

A. D. CARLTON, manager of the coal department of the Cleveland-Cliffs Iron Company, has been enjoying a winter vacation in Florida, accompanied by Mrs. Carlton.

J. F. SHORE has been appointed chief engineer of the Virginia Iron, Coal & Coke Company, with office at Toms Creek, Va. His appointment was effective March 1.

HENRY M. HARTMANN has been named general manager of the new Condor Gold Mining Company, organized and controlled by the International Smelting and Refining Company. Mr. Hartmann was formerly assistant general manager of the Mountain City Copper Company at Rio Tinto, Nev. The Condor Gold Company will operate the Yellow

Jacket mine near Forney, Idaho, until recently held by the Treasure Gold Mining Company.

GEORGE OTIS SMITH, former director of the U. S. Geological Survey, in a recent visit at the Golden Gate International Exposition, expressed his conviction that the Treasure Mountain Exhibit of Mining Exhibits, Inc., is the best conceived mineral exhibit of any of the half-dozen or more exhibitions he has known.

JULIAN D. CONOVER, secretary, The American Mining Congress, spent the latter part of March on a trip through the West, during which visits were made at Denver, Salt Lake City, San Francisco and Reno.

J. O. DAVIS is now division superintendent of the Keystone, Carswell and Maitland mines in McDowell County, of the Koppers Coal Company.

W. R. STEDMAN has been made assistant general superintendent for the United States Coal and Coke Company at Gary, W. Va.

L. M. LINEBERRY is now superintendent of mines Nos. 2, 4 and 5 of the United States Coal and Coke Company at Thorp, W. Va.

—Obituaries—

JOHN C. BRYDON, nationally known in coal operating circles, died March 7 in Chicago from a heart attack. During his career Mr. Brydon had been president of the Quemahoning Creek Coal Company, president of the West Kentucky Coal Company, general manager of the Davis Coal and Coke Company, and president of the National Coal Association. In recent years he was employed by the Chicago, Wilmington & Franklin Coal Company.

CADWALLADER EVANS, III, son of Cadwallader Evans, Jr., general manager of the Hudson Coal Company, lost his life on February 22 when the boat in which he and two American college companions were sailing was wrecked in the Mediterranean Sea during a storm off Caesarea, Palestine. His age was 21.

CHARLES E. ASH, recently reelected vice president and secretary of Glen Alden Coal Company, died suddenly from a heart attack March 8 in Wilkes-Barre, Pa. He was 65 years old. Mr. Ash had served the Glen Alden Company as vice president and secretary for about 10 years.

JAMES W. HUNTER, superintendent of the core drilling division of E. J.

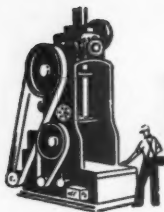
Longyear Company for many years, died in Akron, Ohio, March 5, as the result of an automobile accident. His age was 62. He had been connected with the Longyear Company for 32 years.

DAVID MATTHEWS, secretary-treasurer of the Pittsburgh Coal Exchange, died in Miami, Fla., February 19. Mr. Matthews was formerly connected with the Vesta Coal Company.

ALBERT E. BRUGGER, consulting mining engineer of Los Angeles, Calif., died February 12 from injuries suffered in an automobile accident near Ludlow, Calif.

RICHARD J. PEARCE, retired mining engineer, died in San Jose, Calif., January 18, at the age of 72. His mining career included the superintendency of the famous New Almadon quicksilver mine in California some 40 years ago.

A. CARTER CARY, engineer and assayer of Boulder, Colo., died February 9 at the age of 58. Mr. Cary was active in the Cripple Creek district some time ago, and recently had been associated with A. B. Weldon in the operation of the Boulder Ore Sampler.



MANUFACTURERS' Forum

Full Vision Gas Mask

Acme Protection Equipment Company, Inc., 3650 Liberty Ave., Pittsburgh, Pa., manufacturers of respiratory protective devices, announces a new No. 5 full vision snout type canister gas mask which embodies a number of improvements in gas mask construction.

Outstanding features of the No. 5 mask include full vision lenses, which enable the wearer to see equally as well as when not wearing a mask, and a light-weight canister, directly connected to face piece, permitting the wearer to move about with excellent freedom.



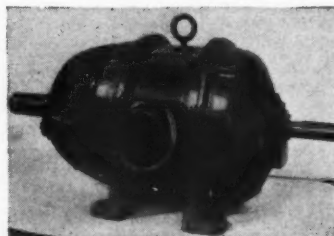
The No. 5 mask is recommended for use in low gas concentrations or for short periods in higher concentrations. Canisters are available for protection against practically all poisonous gases including organic vapors and acid gases, ammonia, hydrocyanic acid, chlorpicrin, etc.

The manufacturer will be pleased to forward complete information and prices upon request.

Hoist and Crane Motors

Motors designed to meet the exacting electrical and mechanical requirements of such applications as cranes, hoists, coke pushers, larry cars, turntables, steel-mill auxiliaries, bascule, life and swing bridges, and rotary car dumpers, are described in a four-page illustrated leaflet published by Westinghouse Electric & Manufacturing Company.

These motors are rated for inter-



mittent service and have 275 percent or more pull-out torque and a starting torque of approximately 90 percent of this value. They are good for 50 percent overspeed and plugging at full speed. Their low-inertia rotors reduce power consumption and minimize brake wear.

A complete line of motors with interchangeable ball or roller bearings is available. Single-row wide inner-race ball bearings, double-row bearings or roller bearings are used as determined by load conditions. An overflow sump helps prevent over greasing and makes unnecessary the previous practice of dismantling the bearings to remove old grease.

MSA Explosives Carrier Earns Award

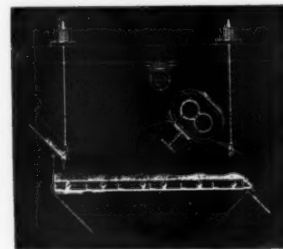
In the third annual plastics competition recently completed by Modern Plastics, one of the industrial awards was given to Mine Safety Appliances Company, Pittsburgh, for their new Explosives Carrier designed by their research department, and molded of special impact resistant bakelite in their own plant.

Because of the tough, moisture-proof, dielectric plastic shell, and sealed-tight cover, when in use, this type of Explosives Carrier makes a safer, stronger and more convenient means of carrying high explosives.

Sta-Kleen Screen

Allis-Chalmers Mfg. Company, Milwaukee, Wis., in connection with its line of vibrating screens, has added a new type of low-head screen especially designed for helping keep the fine mesh cloth clean. Referred to as their Sta-Kleen Screen, it is claimed to be unusually well adapted to the screening of moist materials such as fine crushed stone, ore, and particularly coal, that usually cause "blinding."

Several inches below the screen cloth this new design incorporates a



sub-deck made of perforated metal with relatively large holes. The space between this additional deck and the screen cloth is divided into compartments, each containing a special rubber ball. When the screen is in motion the rapid bouncing of these balls within their respective spaces sets up a secondary vibration in the screen cloth. Blinding is thus reduced to a minimum and without appreciable wear on the cloth. Additional information will be furnished by the company on request.

Sink-and-Float Process Patented

The E. I. du Pont de Nemours & Company was allowed six patents by the U. S. Patent Office March 21, covering its Sink-and-Float process

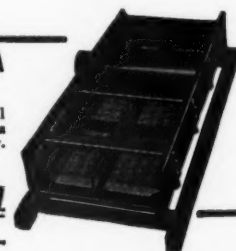
FOR GREATER PROFITS IN 1939, GET A UNIVERSAL VIBRATOR!

Here's a simple, reliable machine that will operate without attention while turning out a thoroughly screened product of finest quality.

Catalog on request.

UNIVERSAL VIBRATING SCREEN CO.

RACINE - WISCONSIN



for the separation of minerals, the most recent invention to emerge from the company's research laboratories. The patents cover the Sink-and-Float process and apparatus as a whole, including a new phenomenon of physical chemistry termed "tough water."

Officials of the company explained that tough water relates to extremely adherent and lasting water films discovered in the course of developing the Sink-and-Float method of separating valuable minerals from worthless material, as, for instance, separating coal from slate. These films are only a few molecules thick, and the peculiar property of toughness of the water, according to the patents, is imparted by film stabilizers which otherwise are known as "active agents," of which starch acetate and tannic acid are examples.

In theory the Sink-and-Float process is the simplest of processes. For example, a mixture of coal and slate is separated when thrown into a liquid that is lighter than slate and heavier than coal. The slate sinks. The coal floats and is skimmed off.

That much was known a century ago. But the liquids that could be used—known technically as "parting liquids"—were worth more than the minerals that were floated in them. Also the losses of the adhering parting liquid exceeded the value of the recovered minerals. Although useful in the laboratory to make perfect separations, the process was economically a total failure in commercial operation.

The idea of coating minerals with water to prevent adhesion of other liquids likewise had been tried by earlier experimenters. However, the heavy separating liquids skimmed the water off the minerals, leaving them almost as unprotected as before. Confronted by these facts, the company's chemists discovered how to stabilize the film of water by means of the "active agents." For instance, they discovered that a water solution containing only two-hundredths of 1 percent of starch acetate forms a film so tough that not even a violent agitation of the mineral while under the disrupting influence of the parting liquid will dislodge it. Thus the parting liquid is prevented by the film of tough water from adhering to the mineral. Such films probably are not more than three or four molecules thick, being in thickness similar to soap bubbles. So tough are they, in distinction to ordinary bubbles, that they will actually form an impenetrable covering over a bubble of air on the surface of the mineral.

The patents issued cover both the Sink-and-Float process and the apparatus as a whole, including the method of recovering the parting liquid, the actual step of separating the mineral from the worthless material, and the idea of using a moving stream of water above the parting liquid.

The patents also cover the idea of producing coal of standard ash content. Heretofore, it has been extremely difficult to produce coal that can be guaranteed as to its fuel con-

tent. By floating the pieces of coal containing admixed slate in the liquid until separation by gravity has occurred, and then discarding all the particles having more than the allowable ash content, an ideal product is obtained.

The Sink-and-Float process may find a large sphere of usefulness in the treatment of coal, iron ores, and of such non-metallic minerals as gypsum, phosphate rock, and fluorspar. The process is not applicable to fine particles but is limited to the concentration of particles larger than one-quarter inch in size. Hence, where the minerals in the ore are coarsely aggregated, the Sink-and-Float process will produce a finished concentrate. In some cases the process may be used to separate a worthless material in the coarse sizes and thus provide a definite operating economy through reduction of the quantity of material which must be processed for final recovery of the valuable material.

Various parting liquids may be used as, for example, such halogenated hydrocarbons as pentachlorethane, which is one and seven-tenths as heavy as water; and tetrabromethane, which is nearly three times as heavy as water.

Portable Compressors

A new line of two-stage, air-cooled portable compressors incorporating a number of improvements has been introduced by Ingersoll-Rand.

These machines are available in five sizes for actual capacities of 85, 105, 160, 210 and 315 cfm of air at 100 pounds pressure. They are powered either by Waukesha heavy-duty industrial type gasoline engines or by Ingersoll-Rand type "H" oil engines.



Probably the most striking feature is the streamlining of the complete unit. Low center of gravity, smooth lines, and an excellent finish result in a practical unit of modern appearance.

The compressor is an air-cooled, two-stage machine which embodies many improvements and retains many design features pioneered by the manufacturer. The use of two low pressure cylinders for each high-pressure cylinder provides 25 percent greater radiating capacity, thus insuring uniformly low operating temperatures. The new models also have patented I-R channel valves which were introduced several years ago for stationary compressor service. Be-

Presenting THE BROWNIE

Line of Mining Equipment

Booth 122 at the Coal Show

The "BROWNIE" Model HKL Conveyor Car Spotting Hoist. A low seam type, 24" overall height, rated 6,000 lbs. rope pull. It is the latest development in car spotting hoists and the result of over ten years' experience in this field.

The "BROWNIE" HGD Conveyor Auxiliary Hoist used for dragging conveyor sections and supplies up to the working point. A portable, easily handled hoist that will save real money in moving material.

The "BROWNIE" BC Tubing Blower. A NEW unit having greatly increased capacity through longer lengths of tubing. A convenient portable electric blower for auxiliary ventilation.

Model RD Electric Car Retarder. A NEW machine with thruster operated brake and motor rewind—for railroad and mine cars.

Model 2F8 High Pressure Oil Spray Pump, so assembled as to illustrate its working principle and operation.

Model TRE Chilled Cast Iron Track Roller, carried on sealed ball bearings.

Model TRF Rubber Covered Track Roller, carried on sealed ball bearings.

MINE CARS & WHEELS
HOISTS • BLOWERS
RETARDERS • PUMPS
OIL SPRAY SYSTEMS
SHEAVES • RERAILERS

THE BROWN-FAYRO
COMPANY

942 ASH ST.
JOHNSTOWN, PENNA.

cause of these valves, the manufacturer claims more efficient, quieter and cooler operation of the compressor.

Complete details, including a two-page chart for selecting the proper size compressor to operate various air tools, are available in a new 32-page booklet, form 3364. Copies may be obtained from the Ingersoll-Rand Company, 11 Broadway, New York City or from any of the branch offices.

Current Collector Design and Fused Trolley Tap Announced

The Ohio Brass Company, Mansfield, Ohio, announces a new current collector, designed for heavy duty



trolley service in mines and industrial plants. This device, the O-B Type F Mine Shoe and Harp, provides a special alloy steel shoe or glider and a one-piece malleable-iron harp casting. The shoe is especially de-

signed for heavy currents, offering over 3 in. of wire contact surface. The pivotal center of the shoe is located in the center line of the wearing surface eliminating any tendency to tilt because of friction. The shoe is always held in full contact with the wire regardless of forward or backward motion. Consequently, there is no opportunity for pulling heavy starting currents through a point contact. An extra-size shunt completes the assembly.

The company also announces the development of a new Fused Trolley Tap with contact ball and accompanying special Bulldog trolley clamp. These two items were designed to provide a convenient method for "nipping" machines and locomotives prior to room work. The regular O-B Type G Fused Trolley Tap is equipped with a contact ball rod. By using the contact ball design instead of the usual hook design, the hazard of accidentally hooking into the overhead is eliminated.

The second item of the combination is a standard Bulldog trolley clamp with heavy bronze jaws, one of which is extended in the form of a fork. When a room is reached the operator simply flips or engages the balled end of the fused trolley tap into this fork where it stays snugly in place while the machine or motor proceeds on cable reel into the room. This forked jaw is so designed that the ball is automatically disengaged from the forked clamp jaw when the motor



proceeds in the opposite direction. The tap is available with any size of fuse and the special trolley clamp is available in the regular 4/0 to 6/0 grooved, Fig. 8 or No. 9 section wire sizes.

PERFECTED PERFORMANCE



The New Leahy Heavy Duty Vibrating Screen

- New and exclusive "TRI-VIBE" triple powers the screen jacket over every square inch with dynamic Leahy differential (patented) vibration.
- No movement wasted on screen frame or supports.
- Consumes only 1/2-hp.
- Maximum capacity, accurate sizing.
- Low maintenance and upkeep.
- Inexpensive stock jackets used. Many types and sizes—driven by belt or motor.



Concenco Duplex Coal-Washing Table

- Advanced design and construction permit larger capacities and faster handling... a finer cleaning job. The anti-friction bearing mechanism assures longer life and economical operation.

CONCENCO
PRODUCTS

are always being improved to meet the increasing demand of leaders in industry. The original Deister Company has had representatives in the field since 1906—men so closely connected with changing conditions that new requirements have often been anticipated and machinery designed in advance of actual needs.

You can always be sure of greater production and lower operating cost—perfected performance—by specifying Concenco Products.

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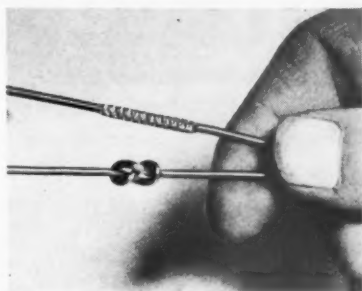
"The Original Deister Company"

Incorporated 1906

917 Glasgow Ave., Ft. Wayne, Indiana, U.S.A.

Improved Magnet Wire

Eliminating the need for space-consuming protective coatings in many instances, Formex wire, a new and superior magnet wire announced January 24 by General Electric, is insulated with a synthetic resin which is tougher and more flexible than the conventional enamel coatings. Since Formex wire requires less space for



insulation and protection, it gives the designer new opportunities to reduce the size of many products. Further, electrical properties are as good as those of ordinary enameled wires, and tests show that Formex wire is considerably higher in resistance to abrasion and to the common treating solvents. When severely twisted and then subjected to a temperature of 125 C for one hour, ordinary enameled wire cracks but Formex wire is not affected.

Peck Carrier Catalog

A new illustrated catalog, No. 1720, has been published by Link-Belt Company on its Peck Overlapping Pivoted Bucket Carrier for the economical handling, elevating, conveying of coal, ashes, stone, cement clinker, Fuller's earth, phosphate rock, and other materials.

The buckets of the carrier are pivotally suspended between two strands of chain, thus always being in an upright position except when they are being discharged by automatic dumper.



This permits a single carrier to carry the material horizontally, vertically and again horizontally. The machine is slow moving, requiring but minimum power, and has been popularly employed in power plants for handling both coal and ashes in the one machine.

A copy of the new book may be obtained by addressing Link-Belt Company, Chicago, Philadelphia, or other office of the company.

Rock Bit Grinder

The Mine and Smelter Supply Company, with headquarters in Denver, Colo., recently announced a new Massco Junior Rock Bit Grinder designed for the user of a limited number of detachable rock bits. According to the manufacturer, this low-priced machine contains all the grinding and sharpening features to produce a correctly ground and efficiently cutting bit.

Adjusting screws are provided for positioning the bit for grinding the gauge to the desired clearance angle and size, and to provide the right angle of contact of the bit's cutting edges against the wheel. Without this full range of adjustments, bits cannot be reground to the best cutting efficiency.

Gauge grinding and face grinding attachments can be furnished alone to convert any bench or pedestal grinding head into an efficient detachable rock bit grinder with little investment. These attachments can be easily installed in a few minutes in front of the wheels.

Complete description will be sent upon request to the manufacturer.

Blasting Agent

A new blasting agent, "Nitramon" S, for seismic prospecting by the reflection method has just been announced by E. I. du Pont de Nemours & Co. It is packed in metal cans with ends which permit joining of a number of separate units before loading in the blast or shot holes.

"The blasting agent is much safer to handle and use than gelatin dynamites normally used for reflection shooting," the company's announcement says. "It is not an explosive in the accepted sense since it cannot be detonated by the strongest commercial detonators, by flame, or by heavy blows which is particularly important for the safety of field crews. Even the impact of a rifle bullet will not detonate the charge."

"The new blasting agent is non-freezing under any temperatures, and will usually be more economical to use than the gelatin dynamites used in this work," the company says.

The strength and velocity of the agent is approximately equal to that of gelatins normally employed in geophysical prospecting.

Special primers must be used with each charge to initiate the "Nitramon" S assembly. The explosive in these primers can be detonated by a blasting cap but is insensitive to friction or even the impact of a rifle bullet.

Welding Cable

A Flexarc welding cable, that is flexible, durable, light in weight and has positive insulation, applicable for field and shop use, is announced by Westinghouse Electric & Manufacturing Company. These cables comply in all respects with latest I. P. C. E. A. specifications for rubber sheathed arc-welding cables.

CATALOGS AND BULLETINS

● **AGITATORS.** *Denver Equipment Co.*, Denver, Colo. Bulletin 2-38 outlines appliances of three Denver agitators, described in greater detail in the following bulletins—Denver agitator or conditioner in Bulletin 3704-B; Denver side air lift agitator in Bulletin 3604-A; and Denver Wallace super-agitator in Bulletin 3423.

● **DRILL STEEL SHARPENERS.** *Ingersoll-Rand Co.*, 11 Broadway, New York City. Form 2176-A details advantages of the IR 54 drill steel sharpener and the 27F oil furnace for mines, quarries, and heavy construction work. 4 pages.

● **GEARED DRIVES.** *Westinghouse Elec. & Mfg. Co.*, East Pittsburgh, Pa. Bulletin 2159 explains the uses, adaptations, and developments of all types of geared drives, including single, double, and triple reduction gear motors; single and double reduction speed reducers; special vertical and right-angle vertical geared drives; single and double reduction heavy-duty mill units; horizontal speed reducers with shafts in vertical plane; geared drives for special problems and conditions, and open gearing. 36 pages.

● **GROUND RODS.** *Anaconda Wire & Cable Co.*, 25 Broadway, New York City. Publication C-14 gives advantages of applications of Anaconda star ground rod and Everdur ground wire clamps. Includes discussion on purposes of grounding, earth characteristics, methods of grounding, and methods of measuring ground resistance. 20 pages.

● **JACKS.** *Duff-Norton Mfg. Co.*, Pittsburgh, Pa. Folder presents specifications and prices of company's new and improved types of all steel mine roof jacks, featured by a conveniently located slide handle which permits easy operation in cramped quarters and provides greater leverage in shoring up mine roofs, timbers and steel I beams. 1 page.

● **LUBRICATING GREASES.** *Standard Oil Co. (Ind.)*, Chicago, Ill. Engineering Bulletin G-88 presents characteristics and general suitabilities of lubricating greases, including a brief outline of their manufacture, and discussion of typical selection problems for grease lubrication, means and methods of application, performance tests, and recommendations. 40 pages.

● **LUBRICATION.** *Standard Oil Co. (Ind.)*, Chicago, Ill. Engineering Bulletin M-118 entitled "Mining Equipment and Its Lubrication" describes in detail types of equipment and lubrication requirements of shovels and draglines, coal and ore cutters and loaders, mine cars and locomotives, hoisting equipment, tippie equipment and miscellaneous equipment used in coal and metal mining.

● **SCREENS.** *Denver Equipment Co.*, Denver, Colo. Bulletin 3883 discusses capacity, advantages, and applications of Denver-Simplicity Gyrating Screens for mines, mills, and placer plants. 4 pages.

● **THICKENERS.** *Denver Equipment Co.*, Denver, Colo. Bulletin 3-38 outlines principal advantages of Denver thickeners, described in greater detail in Bulletin No. 3814.

● **WASHFOUNTAINS.** *Bradley Wash-fountain Co.*, N. 22nd and W. Michigan Sts., Milwaukee, Wis. Brochure 29-H presents company's semi-circular wash-fountains of both 54-in. and 36-in. diameter sizes in de luxe or standard models that may be operated by hand or foot control. 4 pages.

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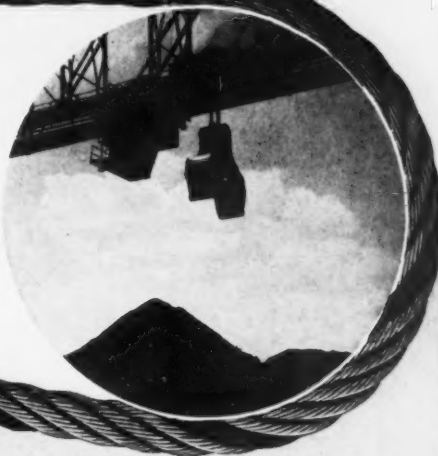
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